FOUNDRY

EST. 1902

TRADE JOURNAL

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. III
No. 2328

JULY 28, 1961

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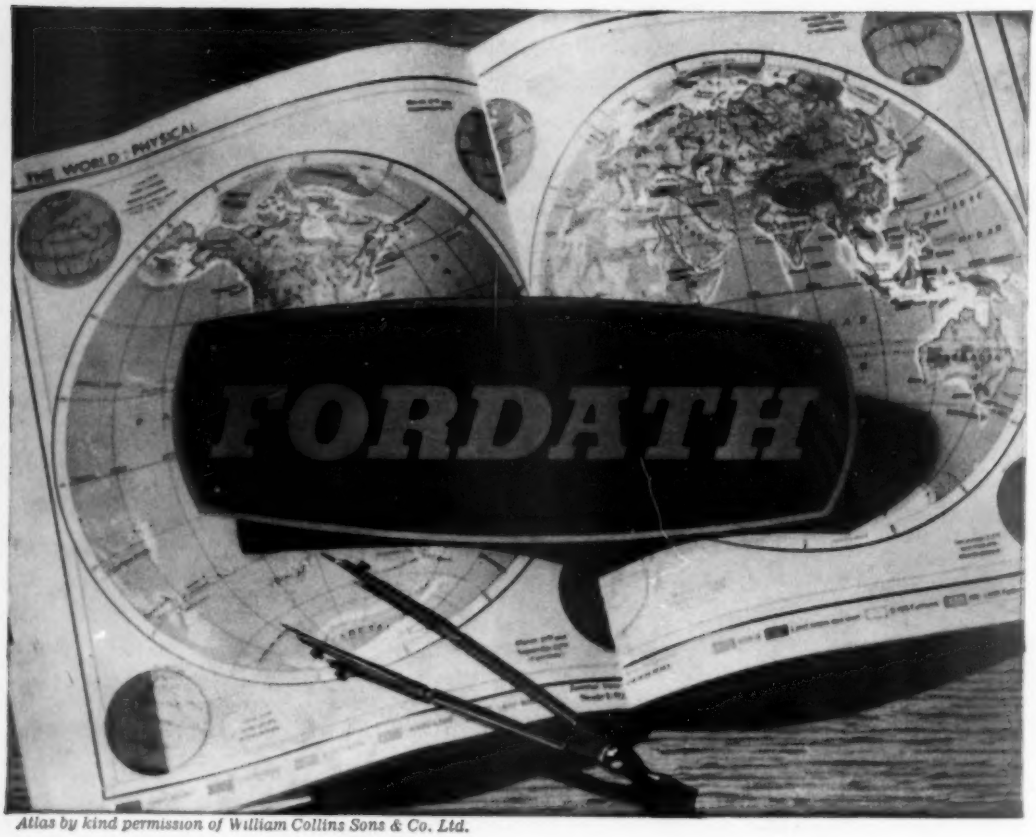

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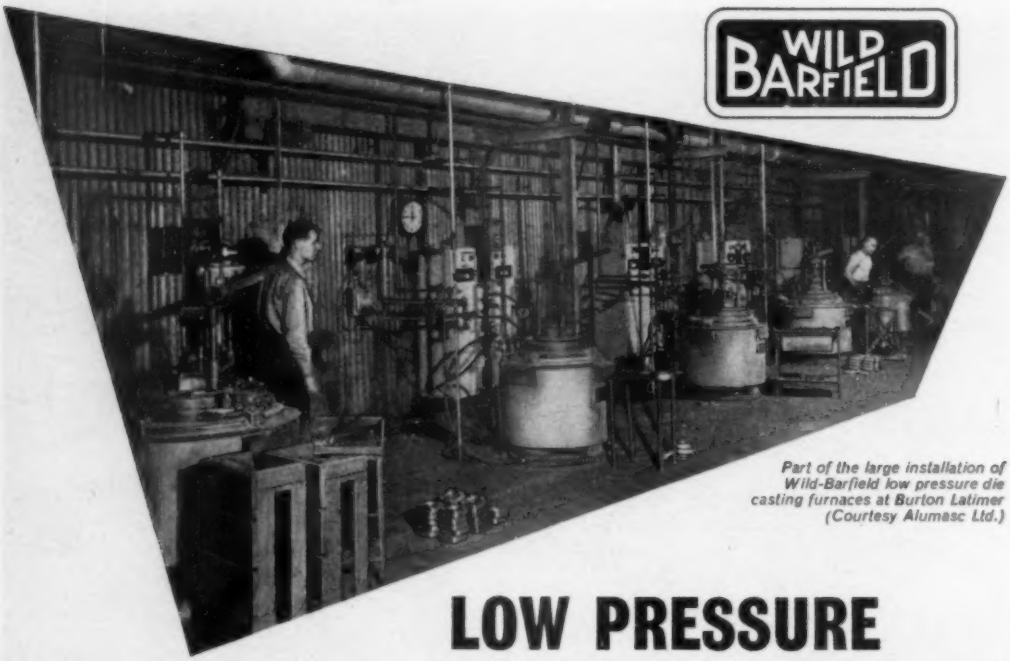

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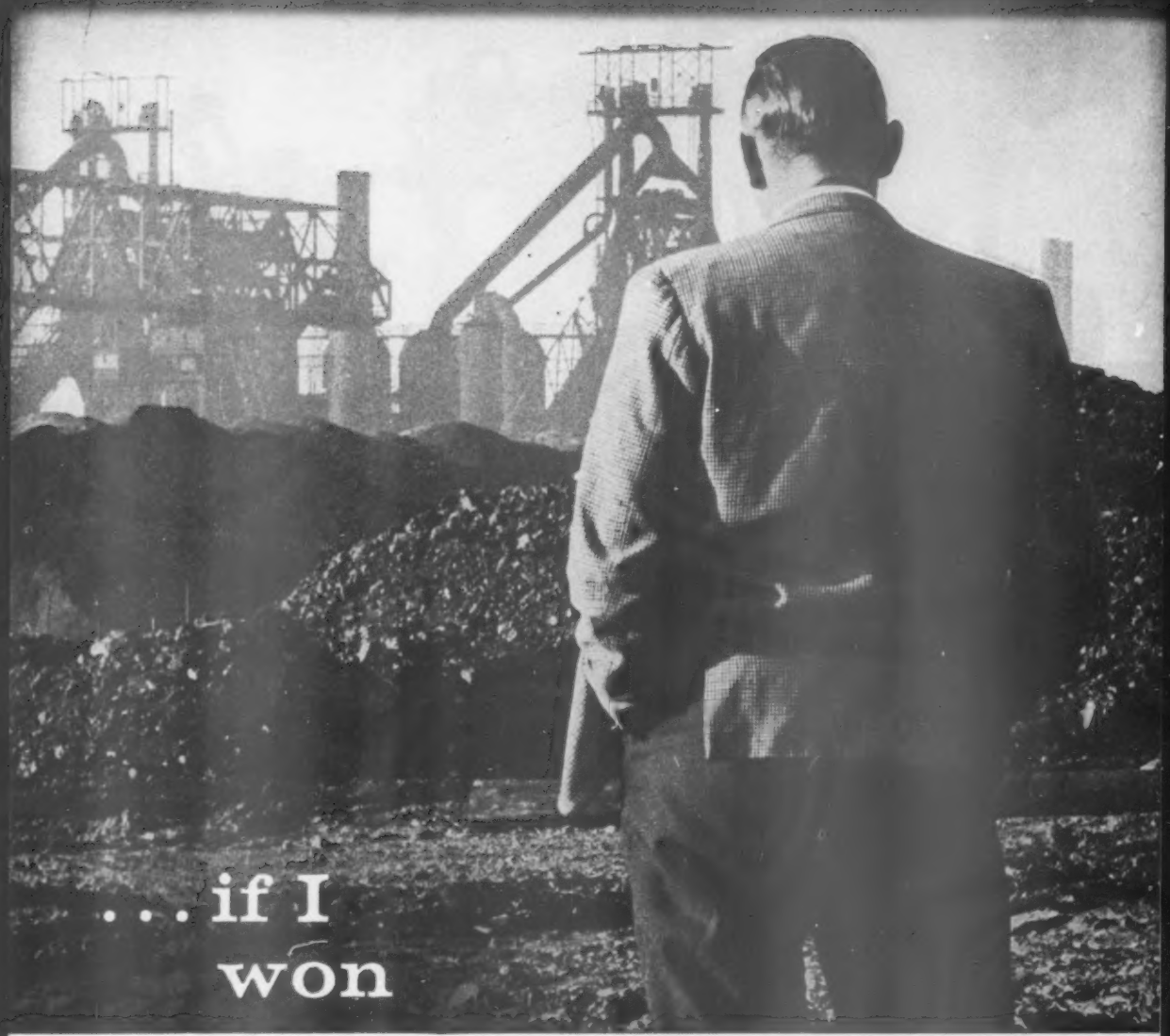

the pools

". . . and I might at that if a couple of teams I could mention were to buy themselves some decent centre forwards.

"Football is a funny game. One week a club is a world-beater and yet a few days later they can be licked to a frazzle by a team from a girls' school.

"Heaven help us if we carried on that sort of caper at AW. Customers don't want firms that are up one minute and down the next. When buyers come to a company with our reputation they expect—and get—a reliable performance. Fancy telling them that a load of pig wasn't up to specification because one of our furnacemen was off form!

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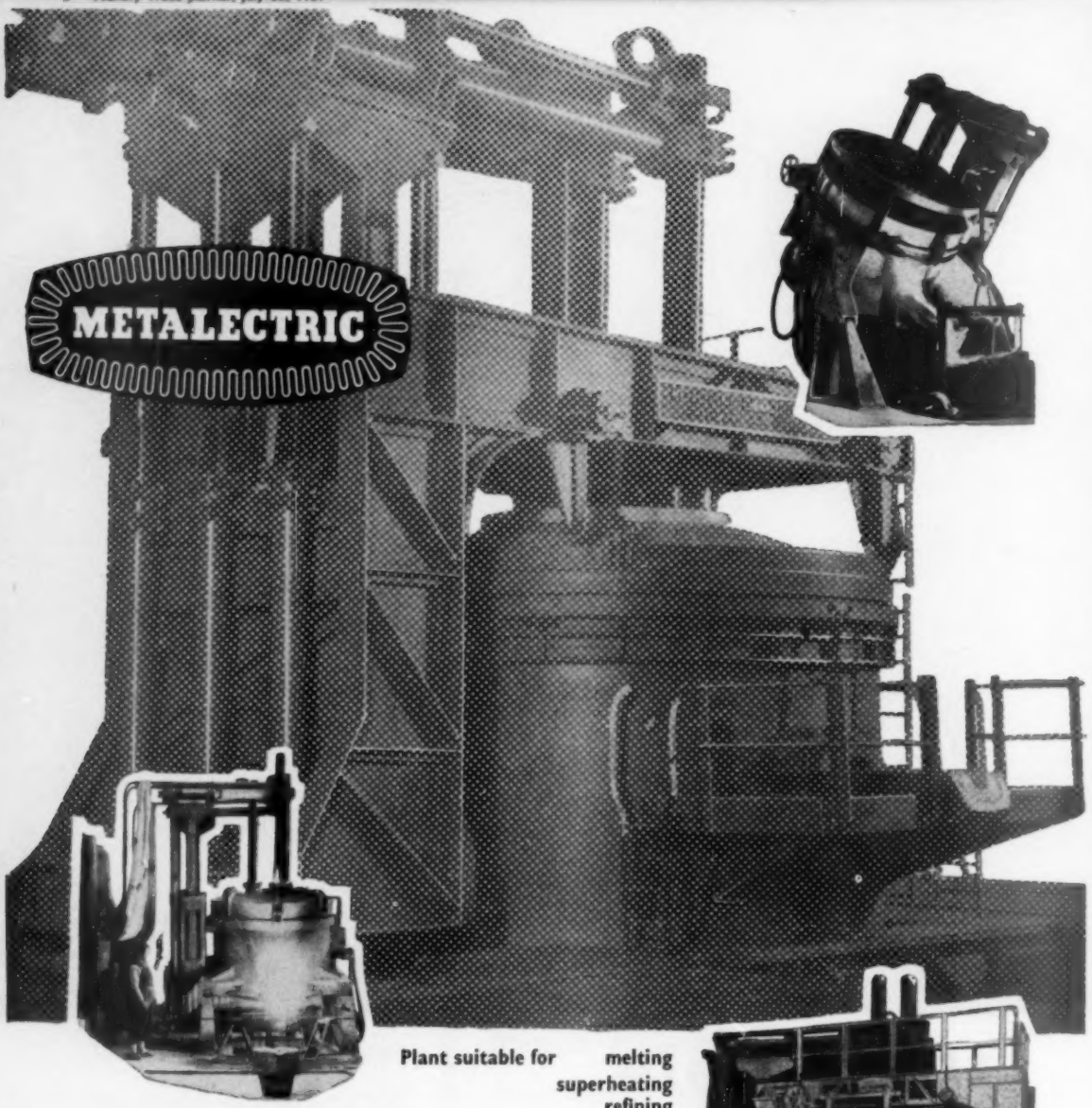

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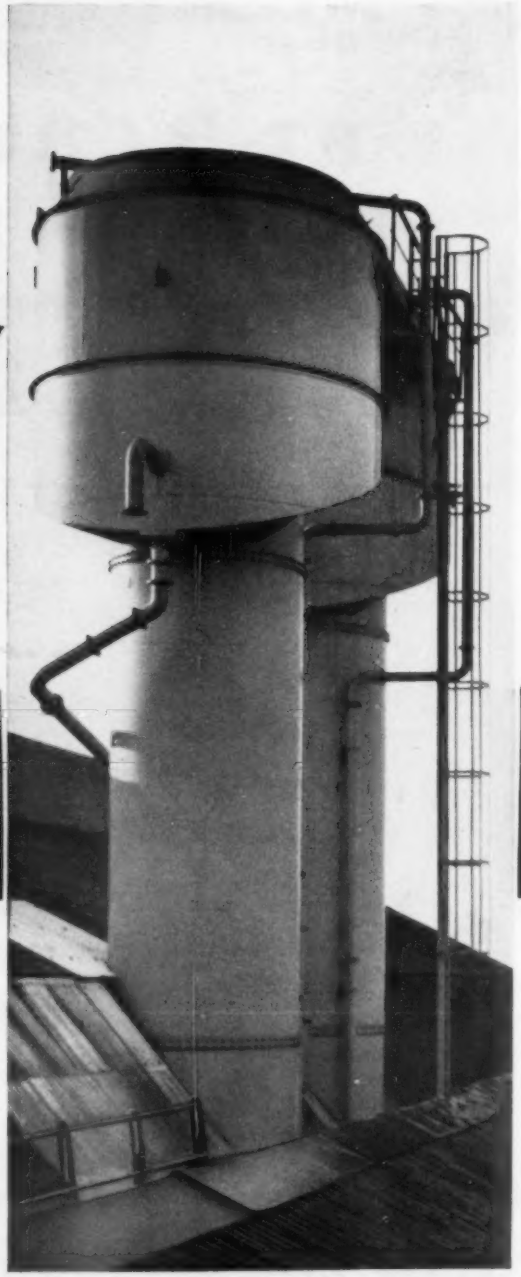

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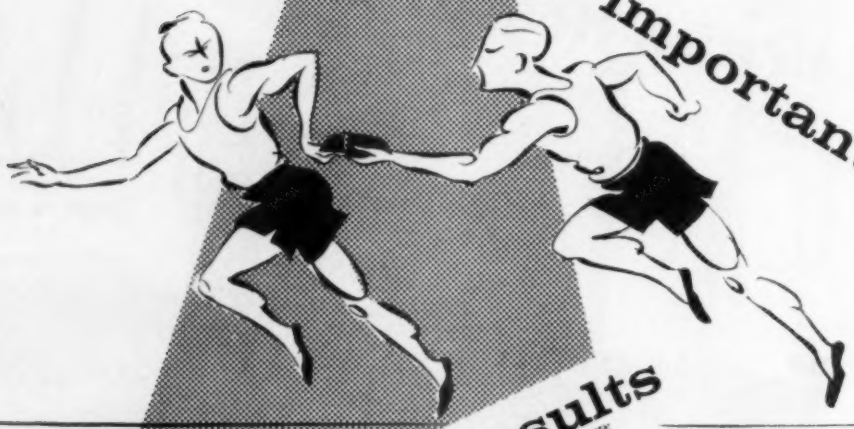

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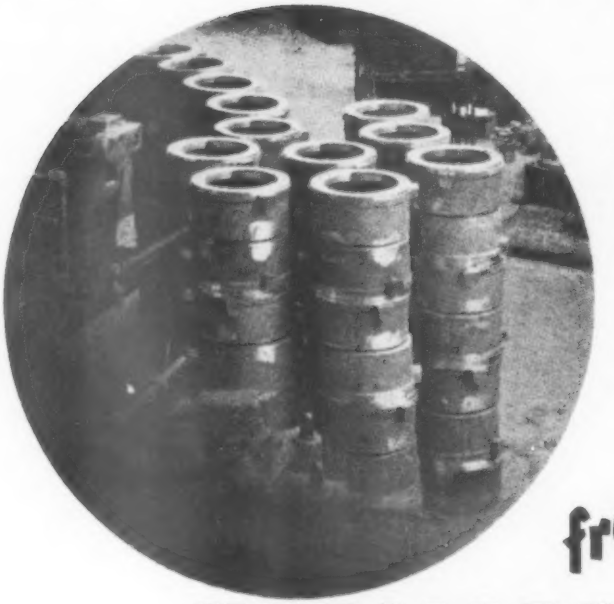

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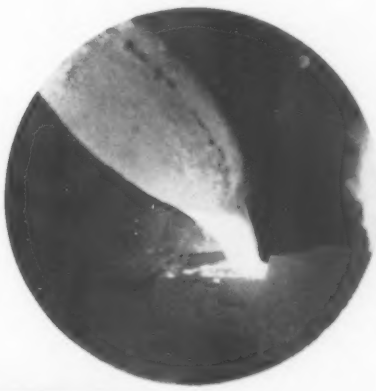

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LEAFLET COVERING YOUR PROBLEM
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A3

Sterling boxes in a world-famous foundry

At the Carron Company's world-famous foundries at Falkirk, tunnel segments for the new Linthouse-Whiteinch Tunnel under the Clyde are now being cast in Sterling rolled steel moulding boxes. The weight of the castings is approximately 15 cwt. per section and the box dimensions are 30in. by 95in., cope 9½in. deep and drag part 22½in. deep.

Illustration shows the type of box used for this operation.

618 Cogent

Sterling MOULDING BOXES

STERLING FOUNDRY SPECIALTIES LIMITED, BEDFORD.

Investigate these NEW

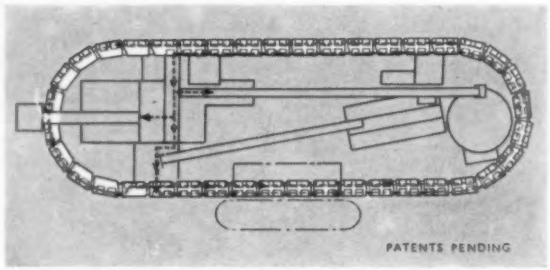
BARTLETT-SNOW
CLEVELAND 5, OHIO

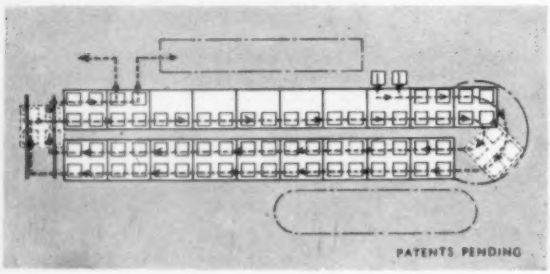
Mould Handling Systems

Unique and Practical

"Double MLC" Mould Handling System

Snap or tight flask moulds are set out in outside position on the car, poured, and travel almost completely around the loop. They are then transferred automatically to inside position on the car, and continue around the loop again for automatic removal at the shakeout. These new systems provide almost twice the cooling time of a conventional mould conveyor carrying only a single line of moulds; effecting substantial savings in floor space, equipment, building, and other facilities.



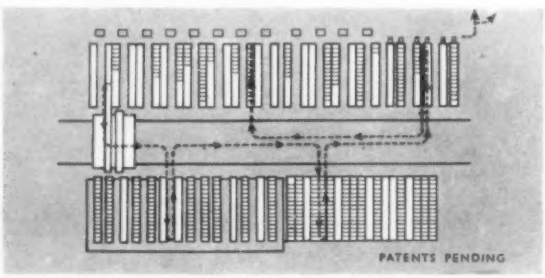


"Double MRI" Mould Handling System

Rectangular loop, consisting of two straight runs connected with a rotary turn and transfer car. Cars advance one car length, then remain stationary for timed period so large moulds can be loaded onto the conveyor, poured, and the moulds removed, while the conveyor is stationary. Moulds are carried side by side on the cars and make almost two complete trips around the loop, thus nearly doubling the cooling time per square foot of floor space.

"MF" Mould Handling System

Unlimited flexibility for jobbing foundries. The transfer car delivers pallets loaded with similar moulds, to the pouring, cooling, and shakeout zones, and returns the pallet with the bottom boards and bands—or flasks—to the moulding area. Handling similar moulds together permits moulds for different castings to be kept separate, and even poured with different metals, without interfering with other groups of castings. Slow jobs do not hold up the fast jobs. Moulding, pouring, cooling and shakeout are centralized, minimizing the equipment requirement.



Write today for a copy of Bulletin No. 135. It gives full details about eight different types of Bartlett-Snow Mould Handling Systems.

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	Silicon	2·0—4·5% (in ranges of ·5%)
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A4

AUTOMATIC PLOUGHS WITH ELECTRONIC HOPPER LEVEL INDICATORS

Europe's Foremost Designers and Manufacturers of Foundry Equipment install many Electronic Hopper Level Indicator and Automatic Plough Systems in Mechanized Plants

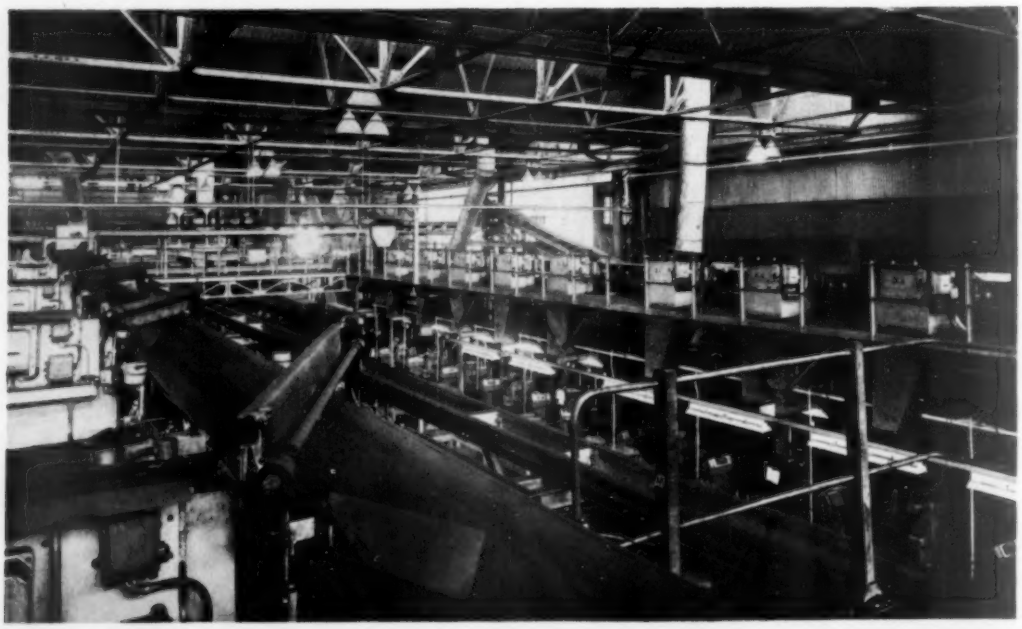
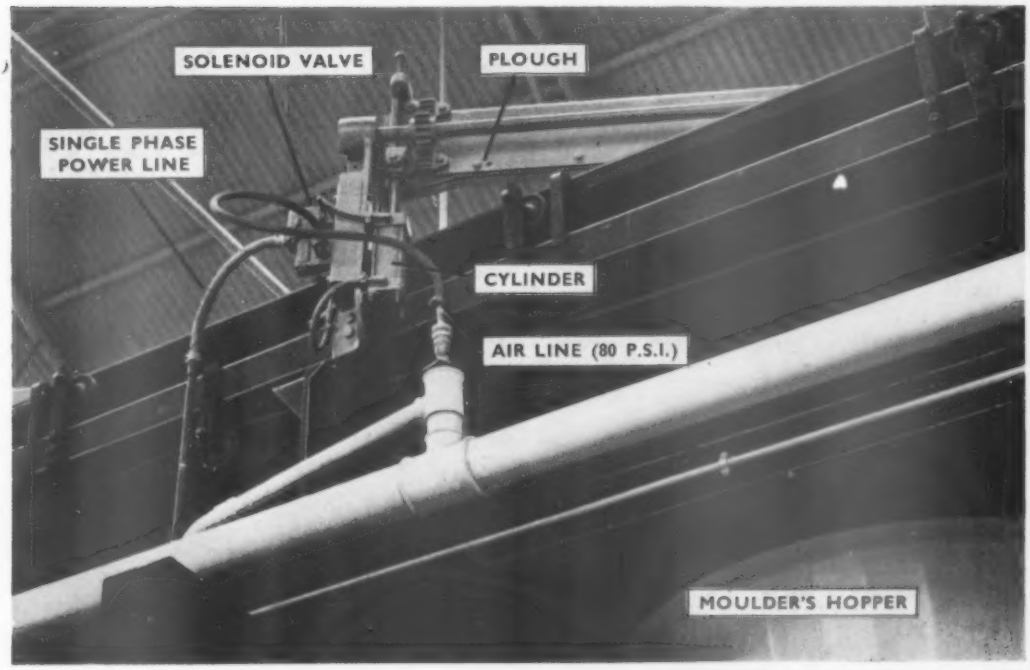


ILLUSTRATION ABOVE SHOWS VIEW OF SANDHANDLING AND DISTRIBUTION PLANT WITH TWIN OVERHEAD CONVEYORS FITTED WITH 16 *AUTOMATIC AND ELECTRONIC PLOUGHS*—ELIMINATING "*THE MAN OVERHEAD.*" *(PHOTOGRAPH BY COURTESY OF LEY'S MALLEABLE CASTINGS CO. LTD., DERBY.)*

TESTED AND APPROVED



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—THIS ANNOUNCEMENT **MUST** *INTEREST YOU!*

Our tested electronic and automatic device cuts labour, reduces effort, improves production, and is a step nearer automation in the foundry. Whether you have two or twelve hoppers our patented system eliminates hand control and "the man overhead" and ensures that every moulder has a supply of sand all the time.

Sensitivity of operation and greater degree of precision of plough control enables total throughput of prepared sand to be reduced for a given mould output.

A proved system "signals" for sand which is delivered to each hopper but not at the expense of another moulder. The plough itself is operated through a TAL-Numatics Solenoid Valve—the valve proved through millions of cycles.

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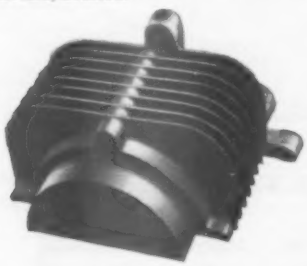
Attention
to
detail

Araldite pattern and casting for a Cooper-Stewart rotary compressor body, made by J. Hobkirk Sons & Co. Ltd, Bedford.



Araldite epoxy resins provide intricate foundry patterns which require no cleaning up before use. The photograph shows the high finish of the Araldite pattern and the metal casting it produces. A pattern cast in Araldite cures at room temperature with no appreciable shrinkage, so that no allowance need be made for double contraction. An Araldite pattern wears better than its aluminium counterpart, can be produced easily, quickly and economically and will not deteriorate in storage. May we send you full descriptive literature?

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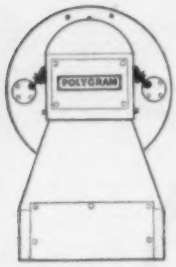
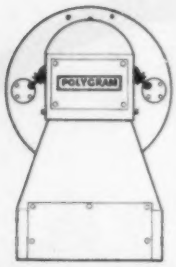
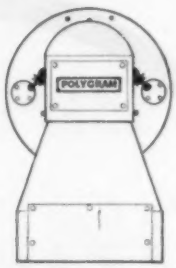


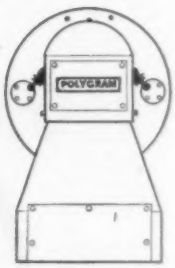
SHELL COREMAKING



SHELL MOULDING

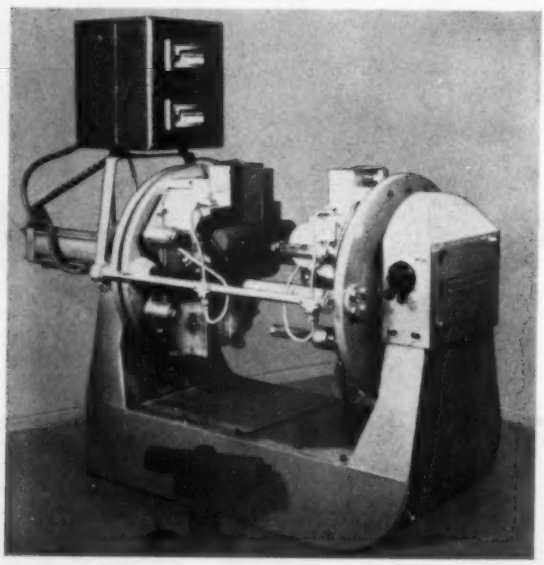


HOT-BOX PROCESS



GRAVITY DIECASTING

ONE . . . Polygram MANIPULATORS for SHELL COREMAKING



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Temperature of each half of corebox electrically regulated within $\pm 5^{\circ}$C.
Can be used with existing core blowers or shooters.
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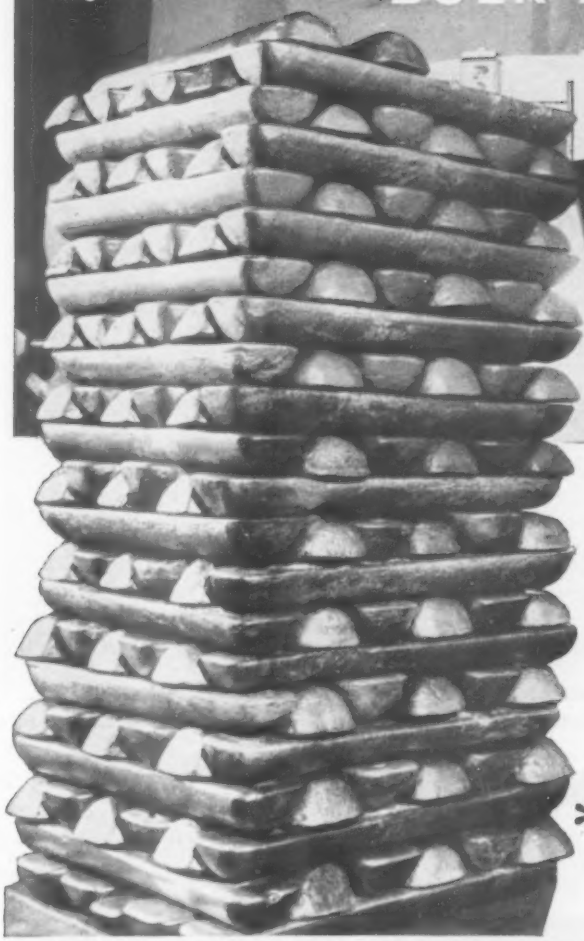

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During the past eighteen months 54 Morgan Basin Tilters have been installed in modern foundries for fast and economical bulk melting of a wide range of high quality aluminium or copper based alloys.

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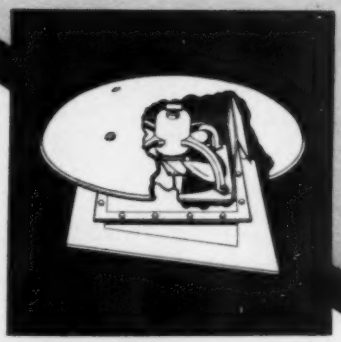
they help to increase production and raise efficiency by improving working conditions



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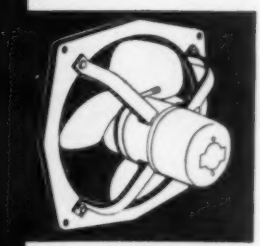

Leaflets are freely available. Ask for: Roof Ventilator, Leaflet No. F/8/1; Wall Fan, Leaflet No. F/3/2; Ring Fan, Leaflet No. F8/9/2.

FENTON BYRN

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P6763

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Here's why

- **INCREASED PRODUCTION** A constant speed is maintained irrespective of load.
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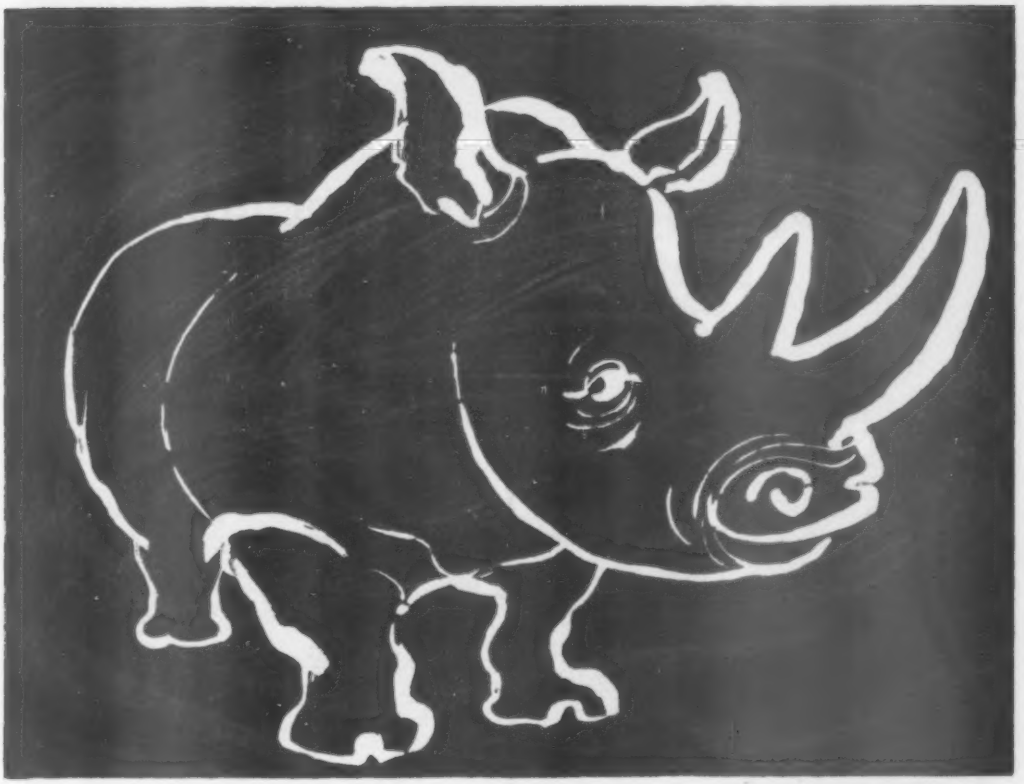

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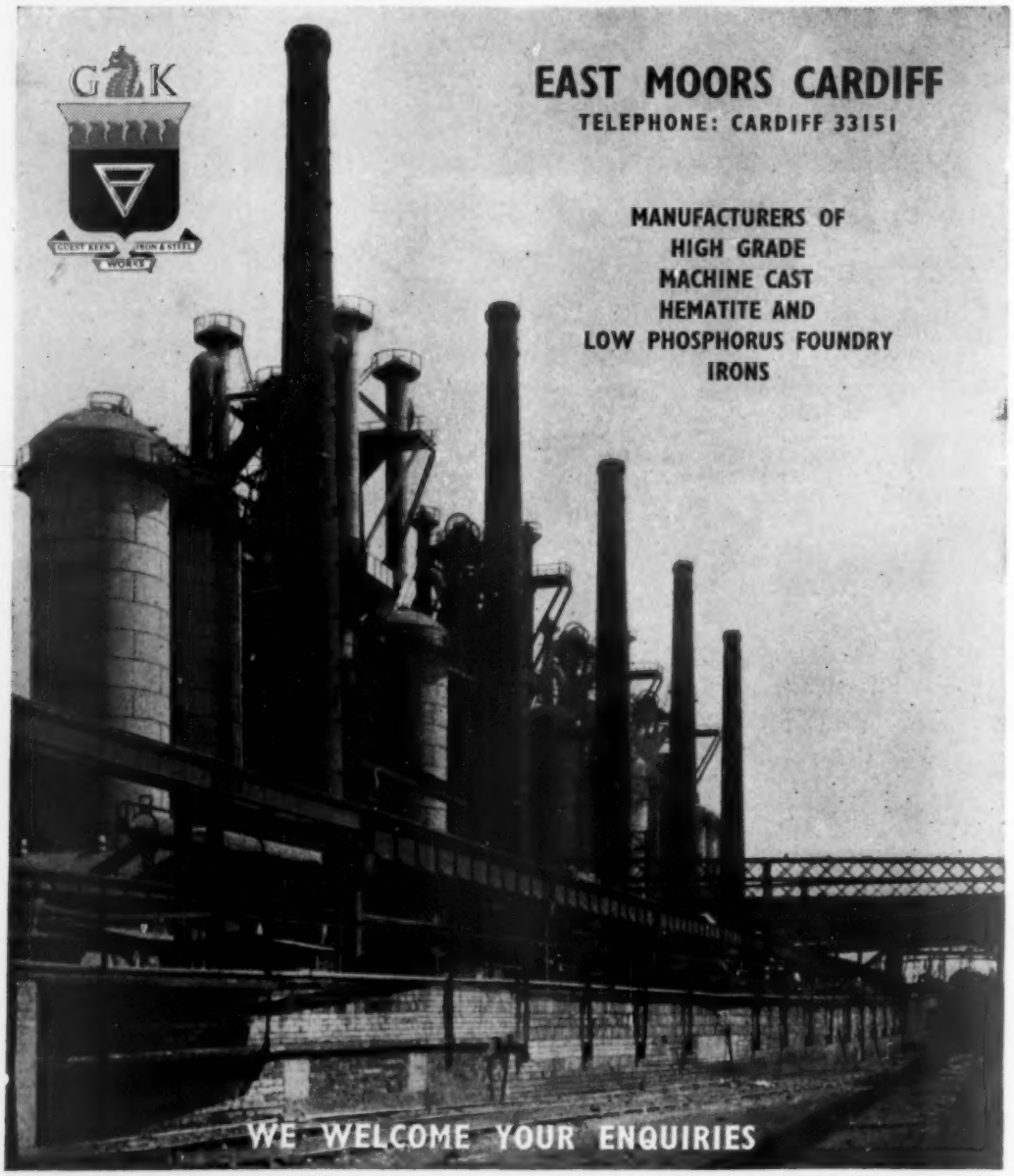

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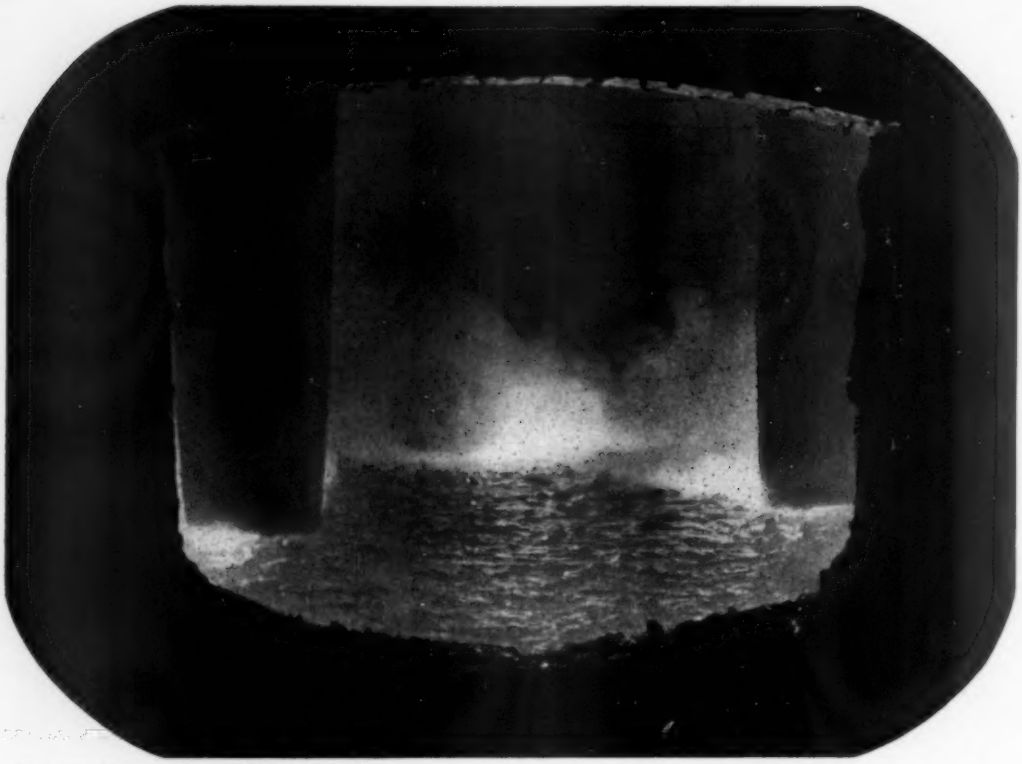

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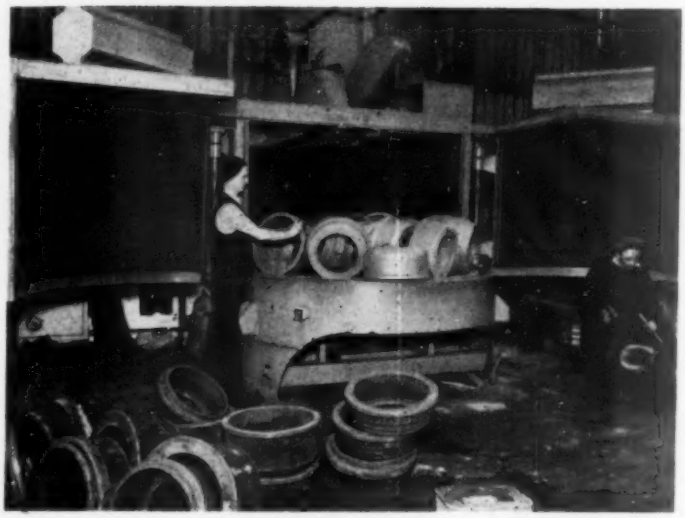

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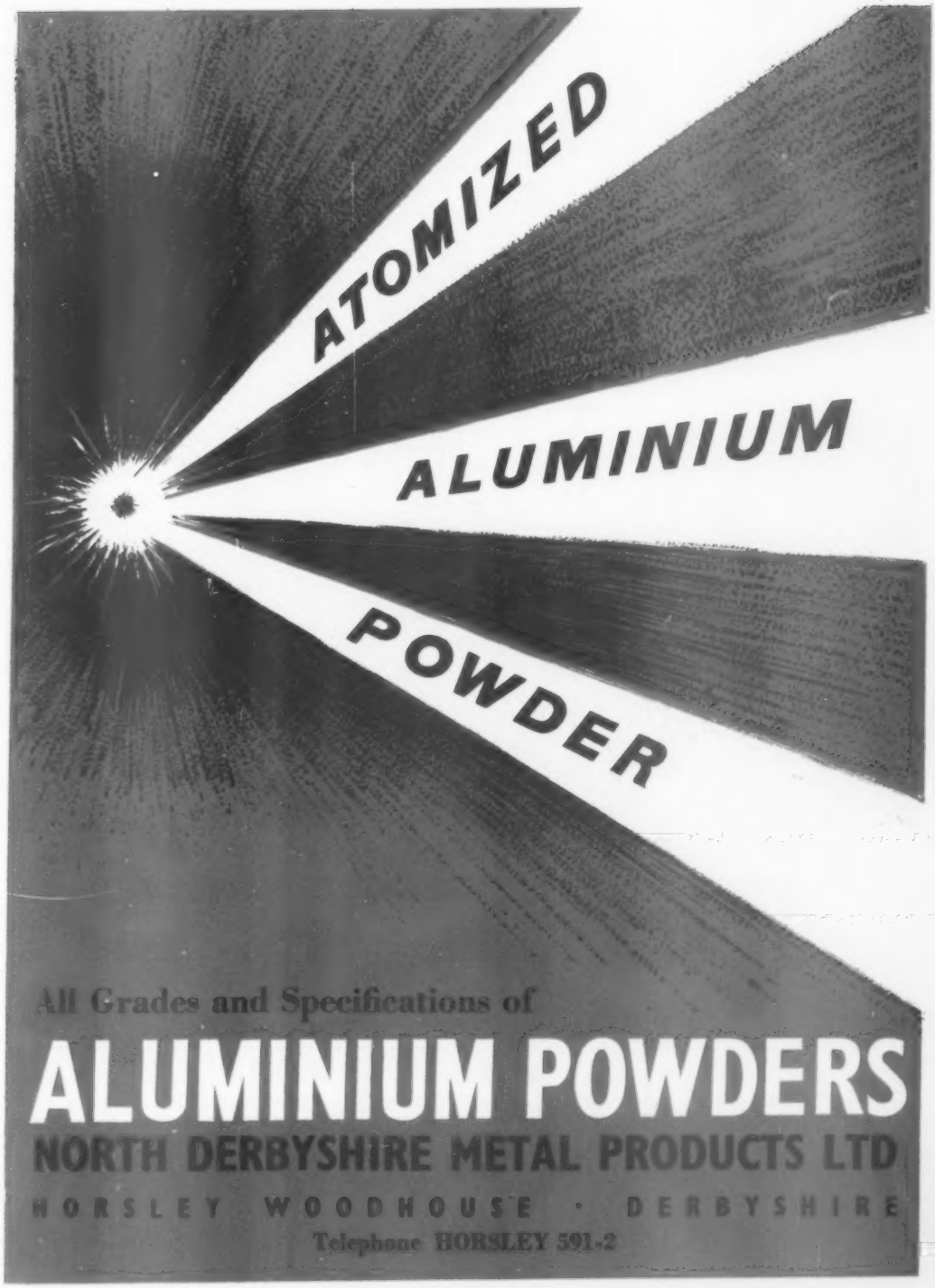
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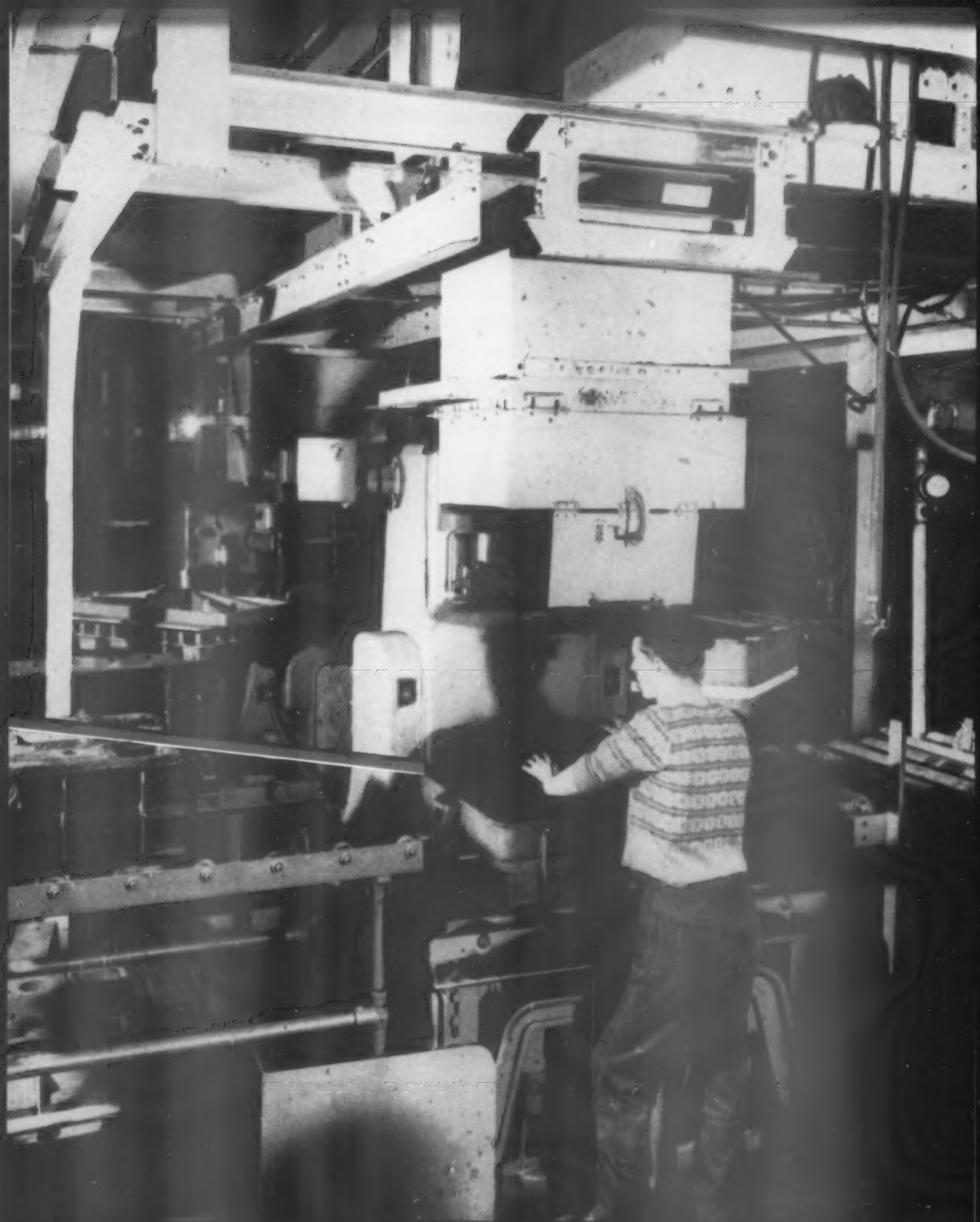

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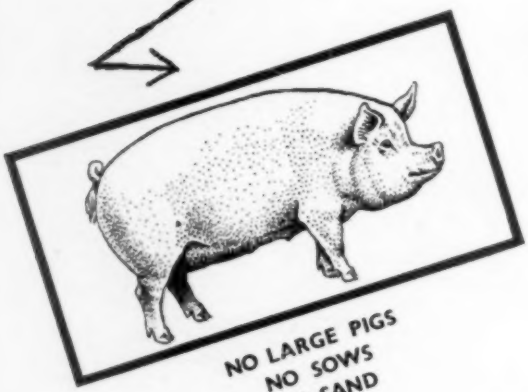

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FOUNDRY TRADE JOURNAL

Vol. 111 July 20, 1961 No. 2328

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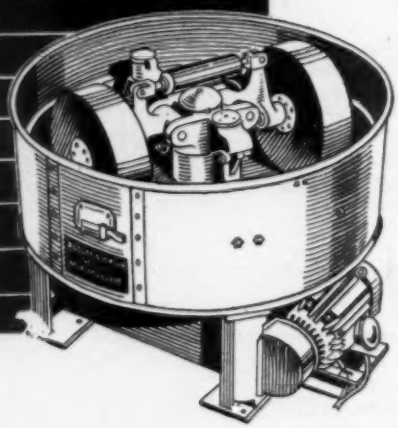

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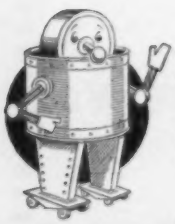

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FOUNDRY
TRADE JOURNAL
Vol. 111 July 20, 1961 No. 2328

Exports to West Germany

A Report* issued by the Export Council for Europe points out that British exports to West Germany have doubled since 1958, and in 1960 every person living there bought £3 2s. worth of goods from this country. The opinion is expressed that these exports "could and should be substantially increased." The Report is illuminated by tables of imports into West Germany from this and other countries, and these reveal that, whilst many of the commodities listed carry castings in their make-up, few enter the category of cast products. The one commodity imported into Germany which may consist substantially of castings comes under the heading "Rolling Mills and Rolls, for Metals," where an increase of 30 per cent. in value from the United Kingdom was shown for 1960 over 1959. Even the improved figure represents but 9·6 per cent. of the total importation, however.

The Report stresses the position of West Berlin, which, with a population of over 2,000,000, is the country's largest manufacturing centre. The familiarity of founders with Düsseldorf and the Ruhr tends to make them myopic when considering the rest of Germany; large markets also exist in the northern sea ports and Bavaria. Not much foundry plant has been sold in Germany. Some firms have managed to get a foothold, whilst others have not so far even tried, yet there is a promising market there. If, however, German foundry managements resemble their British counterparts, maintenance will not be their strong point and thus spare parts should be made easily available. Not only in direct sales of foundry equipment is this important, but also in the supply of machinery. Here the founder would be wise to impress upon his customers amongst those selling engineering products to Germany, that they, too, should stock spares, as is done in the automobile industry.

The selling of consumer goods, such as cookers, baths, and the like, should be done piecemeal—according to the Report. This means making an arrangement with a suitable stores in one German centre for a special display, and ensuring that an adequate stock is available on the spot to meet the consequential demand. Obviously this involves market research and here the advice of the Board of Trade should be sought, as such studies are best carried out by local firms. It is possible that some of the excellent designs recently evolved by British firms are still new on the Continent of Europe and speed is needed in getting these across before the novelty wears off. The general character of the West German market is in many ways similar to our own and presents no inherent difficulties to exporters.

* Trading Opportunities in West Germany; price 5s. 0d., obtainable from the Export Council for Europe, 21, Tothill Street, London, S.W.1.

BWRA Engineering Block

On Wednesday, July 12, the new engineering block of the British Welding Research Association was officially opened before 900 guests by the Rt. Hon. Lord Mills, P.C., K.B.E., and on that day and the one following, an exhibition of "Research in Progress" was open to the Press. Visitors were taken on a tour of the new and well-equipped laboratories and shown various aspects of research undertaken by the Association, which includes fatigue testing, brittle fracture testing, stress-relieving, etc.

The new engineering laboratory occupies an area of 15,000 sq. ft. and the machine-shop occupies three-and-a-half bays. The latter undertakes a wide variety of work from the preparation of test-specimens for engineering researches to the construction of machines and equipment for the research station as a whole.

Plant and Equipment

The department is served by a five-ton travelling crane and is equipped with a range of modern machine-tools, including four millers, four shapers and 11 lathes, in addition to power hacksaws, grinding, planing and engraving machines. Of particular interest to the visitors was a demonstration of a friction welding machine, designed by the Association and manufactured in the central machine-shop. Emphasis at the exhibition was given to new processes, and there is scope for the examination of these by foundrymen with a view to their possible application to the weld reclamation of castings.

The opening ceremony was well organized and carried through with impressive dignity. "Open Days" are also valued by those attending because of the opportunities they provide for meeting again and exchanging experiences with old friends and learning of their current activities in the field of research. Such functions organized by the British Welding Research Association are no exception to this dictum, they always provide a valuable forum for discussing what is new in the various fields covered, and often also give pointers to trends of practice which can be applied in other spheres. For example, the electro-slag welding process has considerable potential interest for steelfounders. Also of value to research workers in other sections of metallurgical practice is the BWRA experience to date with their 2,000-ton-load tensile test-rig and the present construction of 4,000-ton-load equipment, with a longer working stroke. Such machinery, for example, may be capable of determining actual strengths reached in castings of heavy section.

INDUSTRIAL & METALLURGICAL EQUIPMENT, LIMITED, have changed their address to Moor House, London Wall, London, E.C.2.

THE BRITISH STEEL FOUNDERS' ASSOCIATION, 13, Broomgrove Road, Sheffield 10, has issued a folder carrying the caption "Second Thoughts Sometimes Pay." It illustrates and gives details of a complicated steel casting which has successfully replaced one in malleable iron.

SHAW PROCESSES, LIMITED, announce the formation of Shaw Processes (India) Pvte. Limited, Faridabad, New Delhi, India, in conjunction with Electronics, Limited, of the same address. Mr. Brian Shaw, director of the new company, who has spent a number of years in the Far East, in supervision of foundry operations, is visiting the United Kingdom, the Continent, and the United States to obtain up-to-date information from the operating licensees in those countries.

Correspondence

To the Editor of the FOUNDRY TRADE JOURNAL

SOHO FOUNDRY

SIR,—May I thank Mr. A. C. Annis and Mr. J. Blackburn for the kind things they have written about the article of mine on Soho Foundry which you recently published. The example Mr. Annis gives on how stories start is illuminating. I would think, however, that animal dung formed a constituent of moulds several thousands of years ago.

I should like Mr. Blackburn to know that I found a booklet on Matthew Murray very helpful and I suppose it to be the one to which he refers. Matthew Robinson Boulton and James Watt, jnr., were certainly anxious to perfect their greensand practice. I believe they encouraged their men to get temporary jobs in foundries like Matthew Murray's so that eventually they could return and bring the secrets of the art back with them. I seem to recall that one young man went from Soho to Leeds and stayed there. This so upset the Partners that they journeyed north and searched his lodgings while he was at work, even looking in his breeches pockets to see if he had made a contract with Murray.

Whatever initial troubles the Soho pioneers had were eventually overcome and a sound greensand practice was established. We, their descendants at Tame Bridge, one hundred and sixty years later, still make 90 per cent. of our castings in greensand.—Yours, etc.,

A. J. SHORE.

W. & T. Avery, Limited,
Tame Bridge,
Walsall, Staffs.
July 10, 1961.

Foundry Courses at Poplar College

The Poplar Technical College, Poplar High Street, London, E.14, have just issued their prospectus for 1961-62. A City & Guilds Course (No. 61) on Pattern-making and a City & Guilds Course (No. 62) on Foundry Practice are included, both courses designed to cover all appropriate technologies and sciences of the City & Guilds of London Institute syllabuses in these subjects. Practical experience in the foundry is available for the patternmaking section and foundry students are encouraged to take an active interest in the preparation of pattern equipment.

A post City & Guilds class is available to pattern-makers who hold the final certificate or who have been journeymen patternmakers for not less than 10 years. The instruction is of an advanced level and includes gearing and propeller work, the patternmaking being supplemented by practical moulding. Copies of the syllabus and further details of the above courses, etc., can be obtained from the College secretary, Mr. W. Joiner; the classes commence on September 11.

Latest Foundry Statistics

Ironfounding Employment

The Council of Ironfoundry Associations states that, according to the latest Iron and Steel Board statistics, the following number were employed in iron foundries in the United Kingdom during the week ended June 3: males, 121,936; females, 9,309, the total being 109 fewer than a week previous, and 1,696 more than a year ago.

Mechanized Moulding Plant . . .

. . . at R. J. Hunt & Son, Limited

The extension of mechanized moulding at the foundry of R. J. Hunt & Son, Limited, has greatly enhanced the capacity of this works to supply castings to the automobile, agricultural, and general engineering trades. The attendant streamlining of production, with modifications to the melting plant, has enabled an appreciable increase in output to meet growing demand. The following account of these developments places on record a further illustration of trends in the foundry industry.

Before installing new mechanized moulding plant, R. J. Hunt & Son, Limited, had a wealth of experience with repetition moulding and a semi-mechanized system of mould making, and thus placed this knowledge to good advantage especially in the direction of the minimizing of "teething troubles." The new moulding plant was started up with raw labour last October and production was methodically stepped up until by the end of the year, it attained its designed production of 50 to 60 tons of castings per week for the automobile, agricultural and general-engineering trades. The weight range for the new plant was envisaged as ounces up to 35 to 40 lb. with a maximum output of 2,000 moulds per eight-hour day.

A fundamental and desirable feature of this new plant is the apparent extravagance in the quantity of sand being used. The word "used" does not mean "consumed," but implies a cheap way of cooling the sand, its slower deterioration and enhanced surface quality of the castings. The control panel for the sand-preparation and distribution plant is shown in Fig. 1.

The major source of sand is from the knockout, shown in Fig. 2 and indicated diagrammatically as item 13, Fig. 3. For separating the castings, boxes and sand, a pair of Sterling knockout machines are used. The cast-up boxes arrive from the cooling-tunnel section of the mould conveyor and are pushed from it by a pair of hydraulic rams on the knockout. The Sterling moulding boxes used are of uniform size and are returned to the moulders by using the mould conveyor for the drags and a chain conveyor for the copes. The castings are shovelled on to a perforated-tray pendulum-type conveyor (Fig. 4) for cooling and are then transferred to the fettling shop. This conveyor travels outside the shop where it forms two loops and thereby provides a total cooling time of 2¼ hours. In the company's fettling shop, the Wheelabrator method of cleaning is extensively used.

Sand Preparation

Sand from the knockout is conveyed to an inclined belt where it joins the spillage sand from the moulding machines. This latter sand falls through gratings provided and is fed on to an underfloor band conveyor. Both streams of sand pass beneath a Boxmag magnetic separator and are then elevated into a rotary screen by means of a belt and bucket elevator. The screen is shown at 7, Fig. 3. Sand from the screen falls into a 200-ton capacity storage hopper (8, Fig. 3). Although the sand system is rated at 30 tons per hr., it was thought advisable to increase the inclined belt, elevator and rotary screen to a nominal 45 to 60 tons per hr. capacity, because of the possibility of both knockout sand and return spillage sand combining at certain times to overload the system. The storage hopper is furnished with a

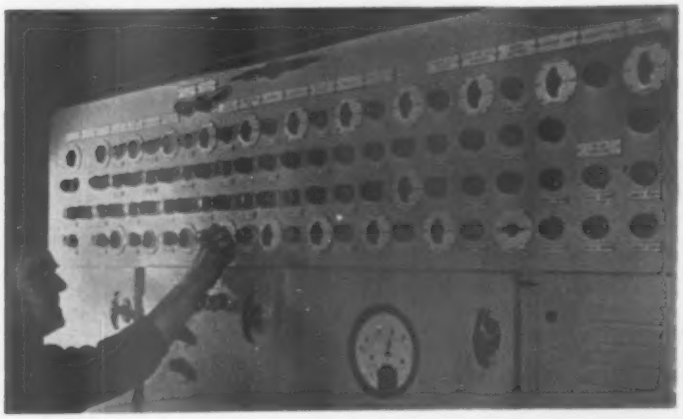


FIG. 1.—*Control panel for sand-preparation and -distribution; automatic cut-out of prior stages prevents overload in case of failure anywhere.*

FIG. 2.—*Operator working at the mechanical knockout which separates the castings, boxes and sand.*

revolving plate closure and sand is ploughed off on to two slow-moving, fully-supporting, 36-in. wide belt conveyors to feed a 30-ton per hr. continuous mill (model SB3 furnished by Foundry Equipment, Limited). Here, additions of coal-dust and binder are added to the unit sand continuously through a pre-set vane-type dispenser, the water being regulated by the sand attendant. New sand is added as required from a separate storage hopper. After milling, the sand is conveyed and elevated to a disintegrater which feeds the distribution belt, situated above the moulding-machine hoppers.

Each moulding machine has its own hopper which, in turn, is charged as required from the distribution belt. This charging is done by a system of automatic sand ploughs, actuated pneumatically and controlled by high- and low-level electronic probes situated inside the hoppers. The control gear for sand conveying and processing is a fully-automatic sequence interlocked panel, having a single push-button (Fig. 1). Overload protection for each sequence item is of the thermal type. When failure occurs, a warning light is illuminated and all plant items previous in sequence to the fault are stopped. The sequence can be broken by the use of by-pass and test positions which are available for each separate plant item, but this is only used for the convenience of maintenance staff.

Moulding Plant

Following an investigation into the performance potential of various types of moulding machines available, it was decided to instal three pairs of British Moulding Machine BQ1 automatic machines, together with one pair of Foundry Equipment magnetic moulding machines. All these machines have a potential production output of the order of 100 to 120 mould parts per hour. Compressed air for the BQ1 machines is supplied at a pressure of 85 to 95 lb. per sq. in. and is obtained from a 300 cu. ft. per min. Alley & Maclellan reciprocating after-cooled compressors. Air requirements for each moulding machine is in the region of 12 cu. ft. of free air for each mould part produced.

Following the making of the mould parts, they are placed on to a pallet-type conveyor (Fig. 5) moving towards the weighting and casting area. In the moulding region curtains have been installed to prevent dust reaching the mould surface when the operator is using a compressed-air jet for cleaning the patternplates. The speed at which the mould conveyor moves can be altered through the use of a variable-speed gearbox, the final drive of which is through a Vulcan fluid coupling, the speed set-

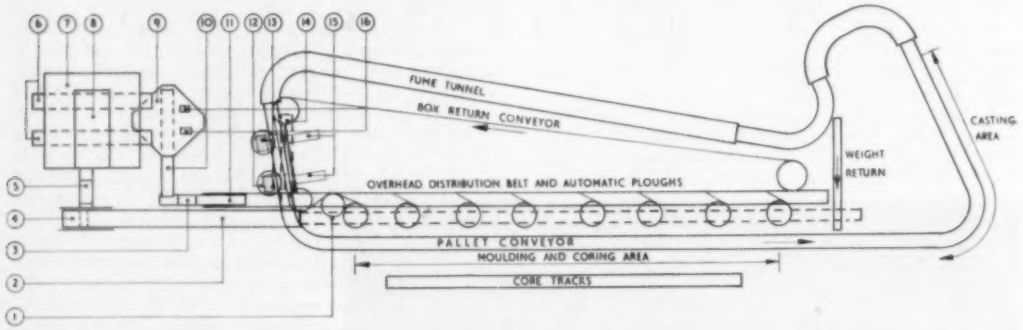


FIG. 3.—*Diagrammatic layout of mechanized plant at the foundry of R. J. Hunt & Son, Limited.*

Key: (1) Spillage conveyor, (2) inclined main-return conveyor, (3) elevator, (4) magnetic separator, (5) elevator, (6) mill feeder belts, (7) 150-ton capacity storage hopper, (8) rotary screens, (9) SB3 30-ton-per-hour mill, (10) milled-sand conveyor, (11) milled-sand aerator, (12) rotary tables, (13) knockouts, (14) knockout conveyor, (15) mould pushers, (16) mill-sand additions feed.

FIG. 4.—*Pendulum-type conveyor with perforated trays for transferring hot castings from the knock-out to the cooling conveyor.*

ting depending largely on production requirements. The conveyor is designed as a closed circuit on which moulds are carried whilst the following operations are carried out:—coring up, box closing, weighting, casting, cooling and box knockout.

To facilitate the coring operations, the moulding machines are sited inside the pallet conveyor, allowing coring to be effected from the outside. This simplifies the supply of cores to the coring

FIG. 5.—*General view of operators assembling moulds on the moving pallet conveyor.*

FIG. 6.—*Pouring moulds on the moving pallet conveyor using 5-cwt. ladles. Note the cooling tunnel on the left.*

station and gives the operators unobstructed access to the pallet conveyor. Two men are engaged in placing weights on the moulds and it might be thought that a dipping chain conveyor could effect this automatically as the same size of Sterling boxes are being used. However, it appears that the down runner is not always in the same place as a variety of castings is made.

The casting of the moulds (Fig. 6) is carried out, using 5-cwt. capacity monorail-suspended ladles, the system being linked with cupola hot-metal receivers. Three ladles are kept continuously in use.

The cast-up moulds pass beneath a ventilated tunnel for cooling and although it was a hot summer's day when the plant was visited, the shop conditions were in every way satisfactory. The exhaust from the tunnel is effected by two 2 h.p. axial-flow fans, exhausting to atmosphere.

Dust and fume extraction from the mechanical knockout, inclined belt, mill and rotary screen, has been ducted to a wet-type arrester, situated outside the building. The arrester incorporates a 40-h.p. fan and the precipitate is removed by a drag-link conveyor.

Site conditions were not easy and building stanchion bases, together with the main storage hopper supporting steelwork bases, are built on piles. The pits are of reinforced concrete construction with a wall thickness of 12 in., lined on the outside with asphalt tanking to a thickness of ¼ in., the tanking being essential to keep the extensive pit system dry.

Melting Plant

During the planning stage of the mechanized moulding plant, it was decided that an improved melting section would be required to serve the

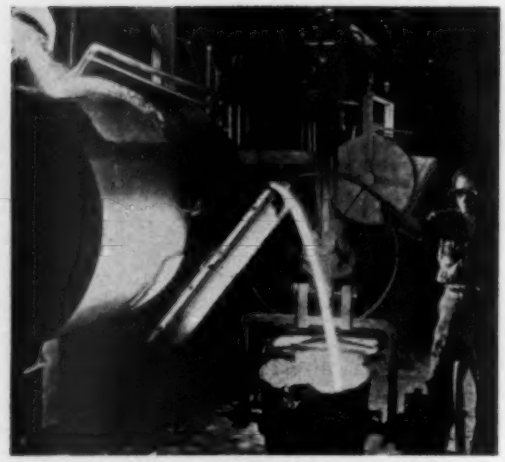


FIG. 7.—*Transferring metal to 5-cwt. ladles from the two hot-metal receivers.*

company's foundry efficiently. The site and time available prevented a complete new melting section being planned, but as it had become essential to fit improved wet-type grit arresters, due to the proximity of dwelling to the foundry, a general plan for the improvement of the cupolas was drawn up. Work had to be done on the cupolas themselves during the only 14 days available during the August shut-down and it was therefore necessary to complete as much preparatory work beforehand as possible, and the improvements made are as follow. The entire cupola baseplate was lifted by 4 ft. to allow of the installation of 2-ton capacity hot-metal receivers (Fig. 7); a 5-ft. 6-in. section was inserted below the charging hole to increase the coke to charging hole level height, this being done to improve general combustion and lower stack temperatures; the stack height was increased above the charging hole to protect the wet arresters against excessive temperature; Whiting-type water-wash grit arresters were installed; larger fans were installed to overcome the stack resistance caused by the increased number of charges held in the cupola stack, and cupola practice was improved by the installation of a central control panel, incorporating blast-volume recorders, fan starters and arrester-pump starters. The fan and arrester pumps were interlocked to prevent the operation of the cupola without first having water flowing through the grit arresters.

The overall height of the cupola was increased to 75 ft., although the diameters of the melting zone remain the same, namely, two cupolas at 5-ft. 6-in. and two at 5-ft. o.d. respectively, the nominal melting rate being 7 and 6 tons per hr. respectively. The height of the mechanical charger was increased to reach the new charging hole, but the capacity remains the same at 9 cwt. per charge. The modifications to the cupola plant were carried out by the Incandescent Heat Company, Limited, and the civil engineering by R. M. Douglas, Limited.

Plant Suppliers and Contractors

Main sand handling, pouring runways and pallet conveyor	Paterson Hughes Engineering Company, Limited.
Dust extraction	Newton Collins, Limited.
Building extension	Stockholding & Steel Limited.
Wiring	Harris Electrical Services, Limited.
Control gear and motors ..	Electrical Construction Company.
Pipework	J. S. Wright, Limited.

BSFA and Export

The British Steel Founders' Association held an export conference at the Connaught Rooms, on Friday, July 14. It was essentially one of a fact-finding nature and represented the first collective approach to the exporting of steel castings which has been made by the steelfounders in this country. Emphasis at the conference was on the exporting of steel castings to Europe, in view of the present possible link between the Common Market and the Free Trade Area.

The conference was held under the chairmanship of Mr. C. H. Kain, managing director of Lake & Elliot, Limited. Amongst those who addressed the conference were Mr. W. G. F. Mowl, of the Board of Trade, Export Services Department, Mr. J. A. Dyer, of the Export Credits Guarantee Department (who gave an account of the service provided by his Department), and Mr. M. H. Taylor, M.I.MECH.E., M.I.PROD.E., who described the operation of the very successful export organization for British engineers, provided by the BESTEC Export Assistance Service.

CHARLES W. TAYLOR & SON, LIMITED—Mr. Christopher Nicholls has been appointed a director.

Davy-Ashmore Executive Changes

Board of Davy-Ashmore, Limited, has designated Mr. M. A. Fiennes as chairman to succeed Mr. D. F. Campbell, who is retiring from the board at the annual meeting in September. Mr. Fiennes remains as group managing director of Davy-Ashmore. Mr. L. H. Downs will become vice-chairman. Mr. Campbell joined the board of Davy Brothers, Limited, in 1935 and became chairman of its successor, Davy-United, Limited, in 1944. Upon the merger with the Power-Gas Corporation, Limited, in 1960, Mr. Campbell agreed to continue as chairman of Davy-Ashmore, Limited, during the transition. While remaining chairman of Davy & United Engineering Company, Limited, one of the principal companies in the group, Mr. Fiennes has now relinquished his appointment as managing director of that company and Mr. M. F. Dowding has been appointed in his place. Mr. Dowding is already a director and was formerly general manager, machinery division. Major W. R. Brown, a former chairman of the Power-Gas Corporation, Limited, retired from that board prior to the merger in 1960, but joined the board of Davy-Ashmore to assist during the transition period. He retires at the annual meeting, remaining a director of Ashmore, Benson, Pease & Company, Limited.

Vienna Diary . . . .

. . . by A. R. Parkes

Continuing the story of the International Foundry Congress held in Vienna from June 19 to 24, the activities of this eventful week are carried forward to include a description of two of the foundries visited, the section being concluded with brief particulars of post-congress tours. Both foundries are part of the Steyr-Daimler-Puch organization, a very large automobile producing firm which also has a number of works in other parts of Austria. The account commences with extracts from the history of the organization and continues with details of plant installed and comments on the mechanization schemes, etc., of the two foundries.

(Continued from page 44)

Steyr-Daimler-Puch

The works visit to Steyr-Daimler-Puch which necessitated a journey from Vienna to Steyr of about 120 miles each way brought delegates somewhat sleepy-eyed to the coaches at the Hofburg at 6.30 a.m. Here a welcome coffee and roll was available to speed them on their way and a short stop at one of the towns *en route* for a second breakfast helped to sustain them. On arrival at the works at about 11 a.m. delegates were taken to one of the works courtyards where an array of about 30 vehicles which comprised some of the finished products of the group were displayed in a circle for inspection. Arranged on exhibition were about a dozen models of tractors, half a dozen lorries and a dozen types of cars; the latter included a version of a jeep-like vehicle with an air-cooled engine and four-wheel drive for which is claimed a quite remarkable performance.

The oldest of the three motor-vehicle firms which were merged in 1934 into one large industrial group, the " Steyr-Daimler-Puch A.G.," was originally Austrian Daimler Motors A.G. in Wiener Neustadt (lower Austria) which had acquired in 1898 a licence to work the patents of Gottlieb Daimler of Mannheim, who produced his first motor-car in 1886. A mere seven years after starting the production of Daimler cars, the Austrian works developed their own designs and the cars " Austro-Daimlers " brought the firm a nearly uninterrupted sequence of international racing victories, many important European motor-car contests and rallies of the period.

The other partner, the Puch-works, nearly as old as Austro-Daimler, was founded in Graz in 1899 as a bicycle factory. Then, in 1901, the first one-cylinder 2½-hp motorcycle was built in these works in Styria and this was followed in 1906 by a 2-cylinder machine which at once won the Gordon-Bennett trophy against French and English competition. The Puch works therefore range amongst the oldest motorcycle works of the world.

The third partner, the Steyr Works, which took the lead in the 1934 merger, was established in 1864, the company being originally only concerned with the manufacture of small arms. In 1919, the firm built a new factory at Steyr (upper Austria), which began the production of lorries, aero-engines, motor-cars and ball-bearings.

After the second world war, when most of the workshops were in ruins, the situation of the group seemed to be rather hopeless and the distress among the workmen considerable. However, co-operation by all concerned made it possible to re-erect the workshops, to instal machines, to obtain material supplies and to start anew the production of ball-bearings (70 per cent. of the production being for export), of diesel-engined tractors, lorries and buses, of standard petrol-engine, sports and luxury motor-cars and of stationary diesel engines.

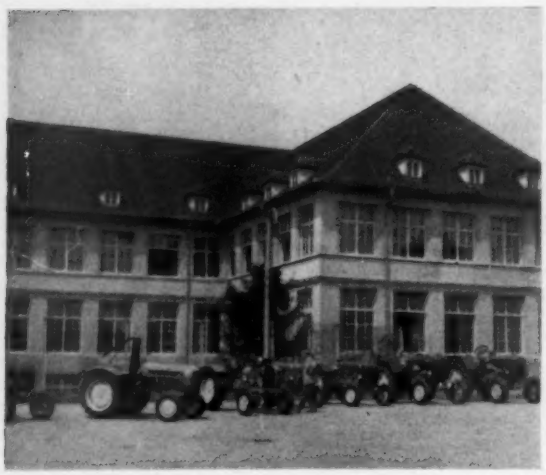
In 1949 a contract was made with the Italian firm Fiat Motors in Turin for the assembling of Fiat motor-cars in Austria, which enabled the Steyr works to concentrate on their own increasing production of diesel tractors and of 4- to 6-ton diesel lorries which use the newly developed 6-cylinder Steyr diesel engine. To-day the Steyr-Daimler-Puch group employs a total of about 15,000 workmen and employees. During the Foundry Congress, only the No. 1 and No. 2 Foundries of the group at Steyr were visited by the whole party, though some stayed on to inspect the ball-bearing works.

Before the foundry tour commenced, the delegates were given an address of welcome by Dir. Baumgartner, commercial manager at the Steyr works, speaking in German, and following this, Mr. Franz Winter, manager of the foundries, forge and sheet-metal shops at Steyr, gave a short talk, also in German, describing the set-up of the works, the plant and equipment of the foundry, methods of operation and plans for future development. The gist of this has been translated as follows.

Set-up of the Foundries

Foundry No. 1

The first foundry of the Steyr-Daimler-Puch A.G. came into operation after the first world war in 1920. Planned and equipped for supplying castings for a daily output of about 50 motor-cars, it produced cast iron, copper-base and aluminium cast-



Views taken during the whole-day visit to Steyr-Daimler-Puch at Steyr, near Linz. On the left-hand side are shown tractors which formed a part of the group display of complete vehicles manufactured by the firm and arranged for the visitors' inspection. On the right, Dir. Baumgartner, commercial manager at the Steyr works, is shown welcoming an assembly of visitors outside the works, explaining the set-up and the sections which would be on view.

ings and was—considering the conditions prevailing in the foundry industry in Europe at this time—regarded as so outstandingly modern that the "Iron and Steel Foundry Handbook" by Dr. Geiger (published by Julius Springer) in 1931 devoted 20 pages for its description. For example, the first production in 1927 of a six-cylinder crankcase for the Mark-30 Steyr motor-car as an aluminium-silicon alloy die-casting can be regarded as a remarkable pioneering achievement. In 1929, a six-cwt. electric-arc furnace was installed for the production of small steel castings.

During the second world war, between 1939 and 1943, production capacity for iron castings was increased from 150 to 350 tons per month, but after the bombing in 1944, production came temporarily to an end. After the war and after the bomb damage had been partly repaired, production of commercial castings began again. The present production programme for commercial vehicles started in 1947 and comprises tractor and lorry engines as well as those for stationary engines. Again, in 1952, foundry capacity had to be increased by enlarging the coreshop, and casting production rose to 600 tons per month. In 1955, old cold-blast cupolas were scrapped and replaced by an efficient modern hot-blast cupola installation. Planning for further extensions has concentrated on the iron section, the casting of steel being discontinued and the aluminium foundry being transferred to the firm's works at Graz (Styria).

Foundry No. 2

When a further development of the firm's production programme required a parallel increase in iron castings production, it became necessary in 1955 to plan an additional iron foundry. This foundry, now known as foundry No. 2, started operation in December, 1956, and took over the exclusive production of small castings, ranging from a few ounces to 1 cwt. each. The total output of Foundry No. 2 is at present 600 tons per month. Foundry No. 1 has retained the repetition production of castings within the weight range of one to six cwt. and the production of hand-moulded castings up to 3 tons each. After installing a central sand-preparation plant in Foundry No. 1, which made it possible to change completely from dry-sand to green-sand moulding, the maximum capacity of Foundry No. 1 has increased to 1,300 tons per month.

Future

Future developments at Steyr, at present in the planning stage, will include for Foundry No. 1: Maximum possible change-over in the coreshop to core-shooting; de-coring of castings in a monorail plant; equipment of the south section of the moulding shop for automatic moulding and installation of roller conveyors for the pouring section; improvement of the internal transport system from the knock-out station to the fettling shop and within the fettling shop itself. For Foundry No. 2 are envisaged an increase of the melting capacity (by the installation of two low-frequency furnaces of three tons capacity each) and enlargement of the annealing plant. The present equipment in Foundry No. 2 includes a 5-ton electric-arc furnace

for melting and two low-frequency furnaces, each of four tons capacity, the latter serving as holding units.

Since the beginning of production in Foundry No. 2, all the iron charges in both foundries are exclusively made up basically from unalloyed steel scrap arising in any of the works of the group. This steel is used in Foundry No. 2 by direct melting and here also synthetic pig-iron is produced from the scrap. This pig-iron is then subsequently transferred to Foundry No. 1 for remelting there. The iron foundries are therefore fully independent of outside supplies as far as iron for melting is concerned. The underlying economic considerations in this ironmaking programme have given rise to several metallurgical problems, as the charges have frequently to be melted under conditions of close control. However, systematic large-scale experiments have made it possible to develop a furnace charging system which gives maximum technical quality and optimum economic melting results.

Foundry No. 1 produces from standard metal mixtures a standard iron which, after tapping from a 5-ton receiver, is inoculated in the ladle by measured amounts of ferro-silicon to suit the use intended. A major problem in Foundry No. 2 is carburization of the steel charge, it being necessary in extreme cases to raise this element from 0.2 to 3.6 per cent., and melting and blast temperature, time, the carburizing agents and the layering of the charge are found to be of considerable importance in this connection. It is known that irons of the same basic composition can behave quite differently (as regards castability, shrinkage, cooling rates, etc.), dependent on whether they have been melted in a cupola or in an electric furnace, but these different behaviours can be compensated by individual melting processes, special inoculation treatment and alterations of the gating systems of moulds.

Small stage laboratories are attached to each foundry, equipped for the rapid estimation of C and Si, also there is a sand-testing laboratory for each foundry. Testbars are machined and pulled, however, in a very modern central laboratory of the works.

FOUNDRY PRODUCTION DATA

In the following notes a few technical data are given about equipment and production figures of the two foundries:

Foundry No. 1

Melting furnaces: Two hot-blast cupolas, fitted with tubular recuperators; cupola hearth diameters 38 to 42 in., melting capacity 9 to 10 tons per hour; average melting time per day: 7 to 10 hours; blast temperature: 450 deg. C. Coke consumption: charge coke 12 per cent. coke nuts No. 1, size 1½ to 2½ in. and normal foundry coke for the bed; limestone consumption: 30 to 40 per cent. of the charge coke. Tapping temperature 1,480 to 1,550 deg. C., at the spout; slag separation in the syphon box and granulation by water-spraying at the outlet; the receiver is of 5 tons capacity: a standard charge consists of 30 per cent. synthetic pig-iron (produced in Foundry 2), 30 per cent. steel scrap, 30 per cent. shop returns and 10 per cent. scrap cast iron (from own works), all being weighed on travelling charge-weighing machines. The metal produced has a Carbon Equivalent (CE) of 4.0 to 4.25.

Moulding Shop. The plant in the machine-moulding section includes: (*a*) One very large jolt-ramming moulding machine, of lifting capacity 3½ tons. Cope and drag are usually moulded at the same time and box sizes used are 62 by 42 by 24 in. and 42 by 36 by 18 in., production per shifts being 25 to 40 large boxes (ready for pouring). Unit (*b*) comprises five jolt/turnover moulding machines of lifting capacity 1½ tons, box sizes: 46 by 26 by 13 in. Here production per shift is 35 to 40 complete moulds. Unit (*c*) employs five jolt/turnover moulding machines, lifting capacity 12 cwt., box sizes: 20 by 20 by 4 in., and 28 by 24 by 13 in. with 70 to 80 complete moulds produced per shift. The fourth moulding unit (*d*) comprises several turnover moulding machines, of lifting capacity 8 cwt. and box sizes 20 by 20 by 4 in., and 10 by 16 by 4 in. (production per shift 75 boxes).

Sand-preparation Plant: Two mix/mullers of output per hour, 1,700 to 2,010 cu. ft. Here, bentonite and coaldust are directly supplied from the storage bins into the mullers by means of a circulating conveyor. Used sand returns by conveyor belts from the 3-ton knock-out grid to the used-sand bin of the central sand-conditioning plant (two bins of 2,500 cu. ft. each). Physical properties of the synthetic standard sand are: compression strength: 14 to 17 lb. per sq. in., and shearing strength: 3 to 5 lb. per sq. in.

Hand Moulding Shop. This produces iron castings for the firm's own use only, *e.g.*, for machines, jigs, tools, and dies, of maximum weight 3 tons.

Coreshop. Oil-sand cores, CO_2 cores and black-sand cores are employed in about equal amounts. Sand drying is by oil-fired through-type furnace with cooling drum attached and embodying automatic control. Of coredrying stoves there are one continuous stove, and two elevator-type stoves, all electrically heated. Oil and CO_2 sand are prepared in two coresand mixers, giving 70 cwt. of coresand per hour. Two core-shooters are equipped for the CO_2 process. Physical data for coresand is quoted as: For oil sands: compression strength: minimum 185 lb. per sq. in.; shear strength: minimum 140 lb. per sq. in.; tensile strength: 140 to 280 lb. per sq. in. and transverse strength: 280 to 400 lb. per sq. in. For the CO_2-sand: compression strength: 110 to 140, shear about 40, tensile 20 and transverse 50 lb. per sq. in. Lastly, for the black sand: Compression strength: 185 minimum; shear: 110 to 140, tensile: 110, and transverse: 140 lb. per sq. in.

Fettling Shop. Grinding is carried out on

General scene at one of the technical sessions of the Congress held in the Rittersaal. *At each of these sessions, the usual lecturer's aids were available, including projection apparatus for large or small slides, and all functioned extremely well.*

planer-type grinding machines with 20-in. and 30-in. dia. discs, and shotblasting equipment includes a rotating cleaning machine with four fan blowers, with a total through-put of 1,100 to 1,300 tons per month; the shop consumption is 4 lb. per ton of castings.

In this foundry 1,400 to 1,470 workmen produce on the average 2½ tons of castings each per month, the average weight of castings being ¼-cwt., and the maximum weight on machines being 6 cwt. The weight of cores produced per month is 600 to 700 lb.

Foundry No. 2

Melting Shop.—The main item of equipment in the melting shop is a 5-ton electric-arc furnace, of 2,000 kva. and basic lined with magnesite blocks. During a 7-week period, the furnaces are patched about six times with a tar/magnesite mixture and in this way, a total throughput of 1,700 tons can be achieved with one lining. Electrode consumption amounts to 7 lb. per ton. Three shifts are worked continuously during the five-day week. Tapping temperature of the melting unit is 1,480 to 1,550 deg. C. (real temp.), and the standard charge for iron castings consists of 30 per cent. cast-iron borings, 30 per cent. shop returns, 20 per cent. steel turnings, and 20 per cent. scrap steel. The standard charge for synthetic cast iron is 50 per cent. steel scrap, and 50 per cent. steel turnings.

As a carburizing agent, a granulated electrode graphite (grain size 0.04 to 0.20 in.) is employed, and alloy additions (carbon, silicon, manganese and phosphorus) are used according to the required pig-iron composition.

Other equipment in this section includes two low-frequency induction furnaces of 4-tons capacity each for holding molten metal, with a nominal load of 125 kw. They employ a closed cooling-water circuit and have a crucible life of about 3,000 tons (including three repairs). A holding temperature of 1,430 to 1,480 deg. C. (insertion pyrometer) is employed.

Summary: Total power-consumption (including holding): 700 to 740 kwh. per ton of cast iron at the spout; carbon equivalent (CE), 3.8 to 4.45 according to casting wall thickness and quality required; monthly production: 1,000 tons of liquid iron.

Moulding Shop: Exclusively machine-moulding is employed, using the following equipment: (*a*) stationary line (1): four jolt/squeeze/turnover moulding machines (cope and drag) are moulded simultaneously on each machine; moulding boxes: 12 by 21 by 6 and 12 by 21 by 8 in., hourly rate of production: 20 to 30 moulds per machine. (*b*) stationary roller line (2); with eight jolt/squeeze/pin-lift machines taking boxes: 12 by 21 by 4 and 12 by 21 by 6 in. (70 to 95 boxparts per machine). (*c*) roller conveyor No. 1: two automatic jolt/squeeze/turnover machines 19 by 28 by 10-in. boxes and production rate 23 to 26 boxparts per machine per hr. (*d*) roller conveyor No. 2; two jolt/squeeze/turnover machines, 19 by 28 by 10-in. boxes and making per hour 20 complete moulds per pair.

Pouring, etc.: Effected by overhead monorails and one-man operated ladles of about 4-cwt. capacity; moulding-sand preparation employs two mullers with an hourly output of 900 to 1,000 cu. ft. of moulding sand. Bentonite and coaldust are directly supplied from the storage bins to the mullers by means of a circulating conveyor. Sand requirements amount to 10 tons per ton of good castings, the average casting weight is 8 lb. and with piecework about 11 man/hours are required per ton of good iron castings.

Core-Shop: Sand: all cores are made in oil-sand; core production: exclusively furnished from coreshooters (eight units being in continuous production); coredrying: is effected in an automatically-controlled power-drier fed by a "Horden" circular conveyor; with sand drying by oil-fired continuous furnace with a contiguous cooling unit and embodying automatic control. The coresand mixing plant uses two mixers with an hourly capacity of about 70 cwts. of coresand, which is transported by an overhead monorail to the sand hoppers above the coreshooters.

Coresand consumption is about 11 cwts. per ton of iron castings. With piecework working, the rate is about 8½ man/hours per ton of good castings and the weight of cores produced 140-170 tons per month.

Fettling Shop: Grinding is carried out on planer-type grinding machines employing 20 to 30 in. dia. discs; the piecework hours required are about 10.9 hours per ton of good castings. General information includes the facts that monthly production is 400 to 600 tons of iron castings, 200 to 400 tons of pig-iron; 120 to 140 men are employed, the average casting weight is 8 lb. and maximum 1 cwt.

COMMENT

After the speech of welcome and explanatory talk, given in the open courtyard of the works, the parties toured the foundries, each having interpreters attached according to the languages understood by the guests. First, No. 1 foundry and then—after lunch—No. 2 foundry were visited. The combined parties took luncheon as guests of the firm at the Casino Restaurant in Steyr, a cool lofty room where the generous hospitality of the hosts made return to the heatwave conditions outside something of an effort.

Since the information given earlier about the Steyr-Daimler-Puch foundry set-up is fairly comprehensive, the writer has confined his further observations to comments on practices and plant.

First, in foundry No. 1, the pair of hot-blast cupolas was inspected; these were of GHW (Düsseldorf) manufacture and the blast temperature at the time of the visit (as shown on the well-instrumented control board) was 420 deg. C. Metal appeared " very hot " as tapped, but dropped about 100 deg. C. on passing the receiver. It was being distributed in ladles of about 10-cwt. capacity. From the receiver, these were transported on rail-mounted bogies for a short distance to a pick-up point where they were distributed about the foundry by battery-operated stacking trucks (Irion model). Charge make-up was effected by rail-mounted weigh-bogie, traversing metal, coke and limestone storage bins and thereafter a skip-hoist type of charger was in use.

Particular interest in other sections of the foundry was shown in the mechanized CO_2 coremaking section, utilizing the two Roper Hansberg H 25 blowers, aluminium coreboxes, and two turnover/strip machines for cores up to about 1 cwt. In this foundry, all greensand working is applied and quite large moulds were being prepared in this medium, which was of the fully synthetic type. A proportion of the sand comes from Austria, but some also from Germany and Jugoslavia. Skin drying of quite a considerable proportion of moulds is carried out, using electrical radiant-type ovens through which the moulds pass on conveyors. Particularly noted were neat-looking 500-kg capacity Demag chain-hoists for moving moulds and also portable electric radiant-heaters for skin drying.

Improvement Needed

On passing to the knockout and fettling sections, it was clear that this is the section where much more planning, development and modernization is needed. Operators appeared to be expending considerable energy in chiselling out cores, where in the UK similar spent raw material would have poured out from the casting. Here, too, there was a considerable amount of manhandling of castings. The quality of finish of the product was quite good, however. The " meat-hook " type of continuous shotblast plant was supplemented by a shotblast room at the end, inside which an operator was touching up with a shotblast nozzle. None of the fettlers was seen wearing a respirator, but many had goggles, mainly worn on the forehead—unfortunately representing an almost universal misuse of these protective devices.

Number-two Foundry

In No. 2 foundry, visited after lunch, first the two Brown Boveri pig-iron casting strands were inspected, these being each about 22-yd. long. The party was told that the electric-arc melting furnace, next seen, produced about 2 to 3 tons per hr. of metal; it was basically lined, the throughput being 1,700 tons per week. The low-frequency induction furnaces were also Brown Boveri manufacture.

This was certainly much the more modern foundry of the two and floors and buildings were well maintained, as also were the showers and locker-rooms inspected. The mechanized systems were in good order and the hoods arranged over the cooling sections of the conveyors appeared to be very efficient. On one of the mechanized plants, a complete BMD unit, four machines producing copes and drags simultaneously were operating in conjunction with a quite outstanding automatic knockout unit manufactured by the same firm, and there were excellent fume-extraction and box-return facilities. Practically all moulds were closed with hook-type clamps and all the mould-conveyor pallets had corrugated tops.

Pouring Ladle

Particular note was taken in this section of a home-designed one-man-operated pouring ladle. In place of the handwheel rack-and-pinion type of elevating gear usual for such equipment in the United Kingdom, a neat reversing-type electric motor was incorporated, with a short chain drive to the rack-and-pinion gear. With this, the operator from a double-pole switch could arrange very rapid changes in ladle height up or down.

Also inspected in this foundry was the second and similar BMD moulding unit for smaller boxes, also incorporating four pairs of machines, but without the automatic knockout. In addition, there was newly-installed a model ARP.W.2, Badische fully automatic duplex (two machine) unit (for moulding boxes about 36 by 20 by 12 by 12 in.). Here it was noted that a paraffin/graphite spray was being used as a parting agent, the patterns not being heated. Each machine had its own sand-delivery system by belt from twin hoppers overhead and when inspected a cycle of 100 sec. was needed per box, moulds being automatically laid down on chequerplate aluminium baseboards.

The sand systems of the foundry were well controlled from a central unit installed by Niethammer of Stuttgart, which incorporated the now quite usual illuminated sequence diagram. Batch-type

Vienna Diary

mills were engaged in producing synthetic sand with 3.5 to 4 per cent. moisture.

Chatting with one of the guides revealed that on one occasion when the electric furnace broke down, it had been possible to bring molten metal to this No. 2 Foundry by road (presumably with a police escort) from the No. 1 foundry, a distance of some four km., along somewhat tortuous route.

POST-CONGRESS TOURS

Two coach tours were organized for delegates for the week immediately following the Congress in Vienna. As detailed in the JOURNAL of May 4, these covered the same route and visits but travel was arranged in opposite directions. Some 60 delegates from 14 countries took part in tour number one. These included three from the United Kingdom, namely Mr. D. Sharp and Dr. and Mrs. Everest; Mr. and Mrs. J. Bell and Mr. and Mrs. J. Blakiston also joined in some of the functions. Tour number two was somewhat larger and included one coach for the large Russian delegation alone. As the result of a well-organized bit of showmanship, the two tours met and crossed each other's path on the highest point of the Grossglockner highway, some 8,000 ft. above sea-level.

Leaving Vienna on Sunday, June 25, the first party travelled over the Semmering Pass to Leoben, where on Monday morning alternative visits were paid to the Alpine-Montan Works at Donawitz, or to the Foundry Institute in Leoben. The former is a large modern steelworks, and one of the homes of the LD process of oxygen blowing of steel. In addition to the steel-rail and -section mills, a new continuous strip-mill is currently under construction. The works is about three miles long and a small railway train was provided to conduct the visitors from point to point. The Foundry Institute is also well-known for its researches, particularly on cast iron, but was not visited by the writer on this occasion. In the afternoon, a short visit was paid to the steelworks of Böhler at Kapfenberg. This is a specialist steelworks, but unfortunately many of their more interesting processes, such as the continuous casting of steel, were not seen.

Reception at Graz

Tour one then proceeded to Graz, where a reception was accorded by the local Engineering Industries' Association. In the morning, a visit was paid to the Steyr-Daimler-Puch automobile works in that city. This works is outstanding in that with the departure of the Russians after the war it was stripped of all movable equipment. Since then it has been rebuilt and is now a fine works almost completely self-contained for their production of up to 50 cars and 50 trucks per day, 1,100 Mopeds and several thousand bicycles. Many of the latter are now exported to America where Austria has captured some of the market originally held by British manufacturers. At this works is an exceptionally fine die-casting foundry for aluminium-base components weighing up to 12 lb.

That same afternoon, a visit was paid to the Andritz Engineering Works, where the foundry produces castings up to 60 tons weight, for heavy engineering, including paper-making machinery and steam- and water-turbines.

The tour continued to Villach, and on over the Grossglockner highway. It was here that tour number two, travelling in the opposite direction was met in the hotel at luncheon, well above the snow and glacier fields in the mountains. Tour one, later descended the Grossglockner to Salzburg where in the evening the party was received by the Mayor of the city.

Concluding Phases

On Thursday, the party travelled from Salzburg through the Salzkammergut and in the afternoon arrived at Wels where a visit was paid to Bauer & Company, producers of agricultural equipment and with extensive light iron and malleable foundries. The tour then continued to Linz.

On Friday, visits were paid alternatively to the light-alloy foundry, Mandl & Berger, or to the VOEST Steel Works (formerly the Hermann Goering works). The latter is another large modern plant and shares with Alpine-Montan the honour of developing the LD (Linz, Donau) process of steelmaking. After lunch a visit was paid to the non-ferrous foundry at St. Florian where many of the large bells in Austria have been cast; this foundry also has a shell-moulding section.

The party returned to Vienna *via* the world-famous monastery at Melk on the Danube, with visits, in passing, to Durnstein where Richard Coeur de Lion was imprisoned and later found by Blondel. Time was also found for stops at the local vineyards.

Like the main Congress in Vienna, the organization and time-keeping on the post-Congress tours were exemplary. Austrian hospitality was shown to the full all along the route, and entertainment was provided by nearly all the works visited. The tours provided convincing evidence, if this were needed, of the industrial progress of Austria, the generosity of the Austrian people and the scenic magnificance of their countryside.

East Germany buys more Base Metals from UK

According to figures issued by the Statistical Office of H.M. Customs and Excise, British exports to East Germany of various goods rose very substantially in the first few months of this year. The rise was particularly marked in non-ferrous-base metals, exports of which were valued at £790,352 for the first three months of 1961 compared with £268,317 for the first three months of 1960.

Other goods which showed a substantial increase include machinery (other than electric), which rose from £228,520 to £434,296; scientific instruments, including photographic and optical goods, watches and clocks, which rose from £23,976 to £60,743; and wool and other animal hair and tops, which rose from a nil return to £29,608, all in the first quarter of 1961 compared with 1960. British imports from East Germany also showed a substantial increase in some categories of goods, including scientific instruments, which rose from £25,835 to £49,972, an increase of nearly 100 per cent.

Institute of Indian Foundrymen

Annual Convention, 1961

Inaugurated by the Hon. Sardar Swaran Singh, Union Minister for Steel, Mines and Fuel, the Annual Convention of the Institute of Indian Foundrymen was held this year in Bombay, in April, at the Greens Hotel, under the chairmanship of Dr. B. R. Nijhawan, director, National Metallurgical Laboratory and president of the Institute. The function was followed by a luncheon at the Taj Mahal Hotel, at which the guest of honour was the Hon. Sardar Swaran Singh. The excellent organization of the Convention was carried out by members of the Western Regional branch of the Institute.

The technical sessions were well attended and 15 papers on diverse aspects of foundry technology were presented and discussed in four technical sessions. The leader, and some of the members, of the Indian Foundry Productivity Team, recently returned from a tour of foundries in Sweden, the USA and Japan, gave an interesting account of their tour and used colour slides to illustrate recent developments in metal and wood patternmaking in the USA and Japan.

Welcome to Delegates

Mr. J. V. Patel, chairman of the Western Regional branch of the Institute, after welcoming the guests, referred to the acute shortage of both pig-iron coke, the "bread and butter" of the foundry industry, but went on to say that as a result of the commissioning of the new steel plant in India, there tended to be an easing of the situation.

Presidential Address

In his dual capacity as president of the Institute and director of the National Metallurgical Laboratory, Dr. Nijhawan, in his presidential address, expressed his sincere desire to bring the two institutions close together so that the results of research and development work at the Laboratory could, through the Institute of Indian Foundrymen, be made available to industry. He took the opportunity to place on record the active co-operation and valuable support given to the Institute by Mr. T. R. Gupta, a senior executive of international prestige; to Mr. N. G. Chakrabarti, who had so ably led the Indian Foundry Productivity Team, and to Dr. B. D. Kalelkar, senior industrial advisor to the Government of India, who had been co-opted for the third time as a member of the Council of the Institute. He also complimented Mr. Arjan Vaswani, hon. secretary of the Institute, on his excellent work.

Whilst dealing with the general achievements of the Institute in diverse foundry fields, *inter alia*, training, educational and professional activities, Dr. Nijhawan announced with justifiable pride that the Institute was represented at the International Foundry Congress, held at Zurich in September, 1960, by as many as 10 delegates. He also referred to the valuable contributions made by the official delegates of the Institute—Mr. N. G. Chakrabarti, Mr. Arjan Vaswani and Mr. R. N. Krishnan—in several of the international committees.

Referring to the Indian Foundry Productivity Team, sponsored by the National Productivity Council, Dr. Nijhawan stated that in the context of developments now taking place in the foundry industry in India, the Team's report should prove valuable in re-orientating the pattern of development of indigenous foundry industry with an eye to both exports and the needs of home consumption. He felt that in a developing country such as India, mere transfer of technical know-how from advanced countries would not adequately provide the answers relating to the availability of foundry raw materials, and managerial and technical staff.

In order to cope with the multifarious activities of the Institute, Dr. Nijhawan continued, the Western Regional branch of the Institute was inaugurated in June last year. Within a span of less than a year the branch had not only consolidated its position but had also come forward in arranging the first convention of the Institute in Bombay immediately after its formation. In this connection he paid warm tribute to the organizing ability of the chairman, Mr. J. V. Patel, and his colleagues for organizing the convention at such short notice.

Research and Development

Quoting the president of the Shell Department Company, Dr. Nijhawan said that the nature of scientific activity was such that the participant in it must be endeavouring to change the *status quo*. He considered the role of the research worker in foundry technology as both evolutionary and revolutionary in character. In this connection he referred to the useful work done in the foundry field in different centres in India including the National Metallurgical Laboratory, whose work included publication of a monograph on Indian foundry moulding sands embodying several years' work on foundry and moulding materials; research and development work on the technology of melting and casting, especially of the industrial alloys; development work on clay-bonded and carbon-bonded graphite crucibles and the development of high-purity iron powder for flame-cutting and scarfing of steel castings etc. Dr. Nijhawan then announced that in 1963 the National Foundry & Forge Training Centre would start functioning at Ranchi for providing higher technical education and training in the foundry field.

Future Plans

To achieve increased production of quality castings, Dr. Nijhawan considered it to be imperative that serious thought should be given to the availability of special grades of pig-iron from production units, especially low-phosphorus iron for the malleable-iron industries. He compared the development pattern of the foundry industry in the United States and stressed the need for broad-based development of the foundry industry in India in the context of projected developments during the Third Plan period. In this connection, the indigenous producers, Dr. Nijhawan said, should seriously consider the early development of ancillary industries for the supply of processed raw materials, and also essential foundry moulding equipment and electric furnaces for moulding and annealing using local resources, to enable the Indian industry to maintain its integrated and yet dynamic all-round growth. Production of greensand moulding, Dr. Nijhawan said, should receive sufficient fillip in the years to come. He added that there was tremendous scope for the manufacture of automatic and semi-automatic moulding machines for mass production of repetitive castings in India.

Awards

During the Convention, Dr. Nijhawan announced the following awards for the best papers presented by members at last year's annual convention:—

The Presidential Gold Medal to Mr. S. J. Ghandy and Dr. U. K. Bhattacharya (Tata Engineering & Locomotive Company, Limited), for their paper entitled "Structure and Properties of Bentonites and their uses

Institute of Indian Foundrymen

in the Foundry Industry"; *Mr. T. R. Gupta's Award of Rs.* 250 to Dr. D. P. Chatterjee (superintendent, Metal & Steel Factory, Ishapore), for a paper on "Physico-chemical Aspects of Tellurium-treated Chill Cast Iron"; *Mr. N. G. Chakrabarti's Gold Medal* to Mr. P. K. Sandell (Tata Engineering & Locomotive Company, Limited), whose paper dealt with "Investigations of the Breakability of Knock-off risers," and *Mr. G. D. Binani's Gold Medal* to Mr. S. P. Sud (Central Railway Workshops, Parel, Bombay), for "Improvements relating to the Production of Leak-proof Castings." The awards were distributed by the Hon. Sardar Swaran Singh.

Patron's Message

Sir Jehangir Ghandy, director-in-charge of the Tata Iron & Steel Company, Limited, and patron of the Institute, in his message sent on the occasion complimented the Institute for the excellent work done in raising the professional standards of foundrymen in India. He also expressed the hope that under the able and energetic presidency of Dr. B. R. Nijhawan the Institute would continue to play a useful role in the industrial development of the country.

Inaugural Address

Inaugurating the convention, the hon. Sardar Swaran Singh, highly commended the exceedingly useful work done by the Institute in diverse fields during the last decade since its inception. In the fast moving events of the world today, the Minister said that not only progress was essential in India's development programmes, but speed of progress was also a vital factor. During the past 10 years, he said that India had made rapid progress of which the country could legitimately be proud. The progress was particularly remarkable in steel and coal production—coal production which was 38,000,000 tons at the end of the first Five-Year Plan period has now risen to 60,000,000 tons, while steel production, in the same period had risen from 1,500,000 tons to 6,000,000 tons. Whilst all should be conscious of the magnitude of the achievement compared to performance expected, he pointed out that the basic fact, *viz.*, the progress being made every year, should not be ignored.

In any sphere of activity, productivity and production techniques, Sardar Swaran Singh said, could not be improved unless the latest methods were employed. All available means and latest technological know-how should be used to raise the living standard of the Indian people, and all technical associations in the country should work basically for the advancement of the country. With the availability of raw materials, and the rise in skill, and as long as scientists, such as Dr. Nijhawan were available in the country, there was no reason why further progress should not be made. It should be borne in mind that minor problems could always be adjusted and the requisite type of raw materials could always be procured.

The secretary, Mr. Arjan Vaswani, in his concluding remarks announced the possibilities of the inauguration of a Southern Regional branch, and that next year's Convention would be held in Madras.

BROOKHIRST IGRANIC, LIMITED, a member of the Metal Industries group, have secured a contract worth £50,000 for five sets of marshalling equipment for the new Spencer works at Llanwern, near Newport, Monmouthshire, of Richard Thomas & Baldwins, Limited.

Law Case

Crane Accident—Better Precautions suggested

A jury returning a verdict of "Accidental Death" at a West Bromwich inquest on a man fatally injured in a foundry accident expressed the hope that the firm would make arrangements which would ensure the Factory Regulations being rigidly observed.

The inquest was on Mr. George Bernard Wilcox (35), a maintenance engineer at Dartmouth Auto Casting Company, Limited, Smethwick. On May 18 in the foundry he was on a cross-member above a sand hopper when he was struck by an overhead crane which had been called by the foreman to stack moulding boxes. Mr. Wilcox died in hospital 10 days later following severe fractures of the pelvis.

Mr. Lashkar Singh, driver of the crane, said when he moved along the track he saw no-one, but suddenly felt a bump and reversing the crane found Mr. Wilcox lying on his side on the cross-member. He had not been told that anyone would be working there and did not expect anyone. Mr. William Arthur Snade, maintenance supervisor, said the crane passed over the cross-member on which Mr. Wilcox was working and there was a gap of only two or three inches. He said no maintenance work was done in such a position, except after production work had stopped, and all fitters were instructed to warn crane drivers of their presence, and to stop cranes operating while they were at work.

Mr. A. M. Miller, H.M. Factory Inspector, said that the Factory Regulations provided that if any person was working in any place above the floor where he was liable to be struck by a crane, effective measures must be taken to warn him of the crane's approach.

The coroner (Mr. Alan D. Clark) said it seemed probable that Mr. Wilcox did not expect this particular crane to be working. "It seems to me, however, that instructions in this factory on the method to impose regulations are not altogether too clear and the method of transmitting them between the maintenance section and the production side does not appear to be adequate. There has been too much reliance on the individual." While some temporary steps had been taken as a further safeguard since the accident he hoped a permanent method could be devised automatically to make cranes immobile in such circumstances.

Beilby Medal and Prize, 1961

The administrators of the Sir George Beilby Memorial Fund, representing the Royal Institute of Chemistry, the Society of Chemical Industry and the Institute of Metals, have decided to make awards from the Fund in 1961—each consisting of the newly-instituted gold medal with a prize of 100 guineas—to Dr. Constantin Edeleanu, M.A., PH.D., in recognition of his work on the corrosion of metals and alloys, with special reference to the development of the potentiostat technique and its applications to the study of practical problems, and on the characteristics of corrosion reactions in fused salts, and to Professor Jack Nutting, M.A., B.SC., PH.D., F.I.M., in recognition of his work in physical metallurgy, especially in the application of the electron microscope to the study of the relationship between microstructure and mechanical properties of metals and alloys and to the investigation of phase changes and dislocation interactions.

THE JOURNAL acknowledges receipt of a calendar, July 1961—June 1962, from Craven Brothers (Manchester), Limited, Vauxhall Works, Reddish, Stockport.

European Investment Casters' Association

Eighth Annual Conference in Florence, September 10 to 13.

As already briefly announced in the JOURNAL, the eighth annual conference of the European Investment Casters' Association is to be held from September 10 to 13 in the premises of the *Associazione degli Industriali della Provincia di Firenze*, at Florence, Italy. As at previous EICA conferences, a varied programme has been arranged for delegates and their ladies. At this year's Conference, there will be a number of technical papers (occupying 45 min. including discussion) and a number of short reports (20 min. each including discussion) and it is hoped that these will aid the exchange of ideas on special subjects between those interested in investment casting. Arrangements are being made also for simultaneous translation of the proceedings into English, French and German.

Although this is a European association, it is understood from the organizers that quite a number of American investment casters are attending and, in fact, several are presenting papers.

Competition and Exhibition. In addition to the technical sessions, a competition has been organized in which all participants are asked to exhibit castings they have produced and of which they are especially proud. These should give delegates an overall impression of the potentialities of the investment-casting process at the present time and for this reason the organizers stress that it is important that each delegate attending the Conference should bring at least one casting. The competition is to be divided into two parts, one diploma being awarded to the firm showing the best casting of the year, and another to the firm showing the casting which, in the judges' opinion, does most to widen the scope of investment-casting techniques. It is stressed that the awards will be made to firms and not individuals, each firm taking part being allowed to exhibit up to five different items. Each Conference participant will be entitled to one vote on the "casting of the year" and one vote on the "casting showing best scope."

Social: An informal reception is to be held on Sunday evening at the Hotel Villa Medici for delegates and their ladies and this hotel will also be the venue for the annual banquet to be held on the Tuesday night. A special programme will be arranged for the delegates' ladies. As there are so many places of interest and works of art in the city of Florence, excursions will be limited to a general introductory sightseeing-tour by motor-coach on the Monday morning following the opening ceremony. Organized tours of most of the City's picture galleries are to be arranged for the Monday afternoon and Tuesday.

On arrival in Florence, delegates and their ladies will be presented with booklets (in three languages) which will give information about the places of interest in Florence. The excursion on the Wednesday afternoon for delegates and their ladies will take the form of a visit to the art foundry of Fonderia Marinelli.

Programme Details

Sunday, September 10, 8 *to* 10 *p.m.* Informal reception at the Hotel Villa Medici (delegates and their ladies).

Monday, September 11, 9 *to* 10 *a.m.* Opening ceremony (delegates and ladies), chairman, Mr. H. J. Meerkamp van Embden.

10 *a.m. to* 1 *p.m.* Technical sessions (chairman, Mr. L. Camatini), when five technical papers will be presented as follow: "Vacuum Techniques applied to Investment Casting," by A. Dunlop (Jessop-Saville, Limited, Sheffield); "Investment-Casting Industry in the USA and Foundry Controls to Improve the Reliability of Castings," by R. Waindle (Wai-Met Alloys Company, Detroit); "Surface Decarburization of Investment Castings," by K. Keiper (Pfaff, Kaiserslautern); "Carbon in Precision Castings," by S. Gunde Ohlin (Kanthal, Halstahammer), and "Practical Methods of Dealing with Surface Decarburization of Investment Castings," by S. Peller (Spinnereimaschinenbau, Ingolstadt).

3.30 *to* 5.0 *p.m.* Technical sessions under the chairmanship of Mr. R. Roques, when the following will be presented: "Mechanized Foundry for Mass-production by the Lost-pattern Process," by M. Marinier (Renault, Billancourt); "US Patents pertaining to Investment Casting," by R. W. Tindula (Washington), and "Impact Strength of Steel Cast by the Lost-wax Process," by P. Mathy (Usines Gilson, La Croyère).

5.15 *to* 6.0 *p.m.* Business meeting under the chairmanship of Mr. Meerkamp van Embden, when items included on the agenda are: (*a*) Place and time for the next congress, (*b*) statement of accounts, (*c*) nomination of representatives in the different countries, (*d*) suggestions for further work and (*e*) supplement to the foundry dictionary.

Tuesday, September 12, 9 *a.m. to* 1.0 *p.m.* Technical sessions will be continued under the chairmanship of Mr. R. W. Danielsen, when the following contributions will be presented:—"Problem of 'Non-fill' in Investment Casting," by H. Rosenthal (Frankford Arsenal, Philadelphia); "Vacuum-cast Turbine-discs in Nimocast 713 V," by R. M. Cook (International Nickel Company (Mond), Limited, London); "Drying of the Dipcoat," by P. Buysman and H. J. Meerkamp van Embden (Philips, Eindhoven); "A Case-history," by L. S. Taylor (G. L. Willan, Sheffield); "Estimating Methods for Precision Castings," by J. Sprunk (Böhler, Düsseldorf), and "Problems in Small Shops," by H. Moeschlin (Propharma, Goteborg).

3.30 *to* 6.0 *p.m.* After luncheon, the technical sessions will continue (chairman, Mr. R. Waindle) with the following paper:—"Properties of Alloys Moulded by the Lost-wax Process," by R. Roques (Microfusion, Paris).

4 *to* 6.0 *p.m.* Castings competition and exhibition, chairman, Mr. Meerkamp van Embden.

Commencing at 8.0 p.m. Tuesday's proceedings will conclude with the Association's annual banquet to be held in the Hotel Villa Medici (delegates and ladies).

Wednesday, September 13, 9.0 *to* 11 *a.m.* On the final day of the Conference, technical sessions will be resumed under the chairmanship of Mr. E. M. Schönböck, papers being as follow: "Minicast Process for Commercial and Industrial Investment Casting," by H. Cadieux (Casting Engineers, Chicago); "Casting Problem in Non-ferrous Metal," by K. W. Thompson (K. W. Thompson Tool Company, Long Island, USA), and "A Case-history," by J. L. Gwynn (P.I. Castings, Altrincham).

After a break for coffee (delegates and ladies), Mr. J. H. Marshall (N. Herzmark, Paris) will present a short film, and this will be followed by the official closing ceremony.

Registration and Costs

The conference fee for delegates is L.It.25,000* and L.It.10,000 for their ladies, both charges including the reception and banquet. Conference registration fees

* At the current rate of exchange £1 = 1728 L. It.

EICA Annual Conference

should be paid to the treasurer, Mr. B. J. Helders, cheques, etc., being made payable to "N.V. De Industrie," Vaassen, via their account at Nederlandsche Handel Maatschappij, Kantoor Apeldoorn, Holland, and should be endorsed "For EICC." It is requested that Conference fees should be paid in advance. Conference attendances forms when completed should be sent to Mr. L. Camatini, Microfusione Italiana, Viale Ortles 81, Milan, and delegates are requested to make their own hotel bookings through travel agents or through Thos. Cook, Via Tornabuoni 21, Florence. Applications to attend the Conference should be in the organizers' hands not later than July 31.

Book Reviews

Engineered Castings, by Glenn J. Cook. Published by McGraw-Hill Publishing Company, Limited, 95, Farringdon Street, London, E.C.4; price 66s.

This book is a "must" for all those interested in the design, application and purchase of engineered castings and will do much to persuade them of the advantages of such castings over fabrications. Reading it is deceptively easy, at first it seems that the facts presented are too simple, but on completion, it is obvious that a lifetime's experience has been presented in a very worthwhile way. There are some very compelling punch lines: for instance, the book starts with the phrase "The shortest distance between raw material and a finished part is a casting," later "Any shape can be cast, but not all shapes can be cast at equally low cost," then, "Buying a few tons of metal is simple but engaging a manufacturing partner to supply engineered castings and supporting services, is a complex business, therefore long-term, not short-term arrangements should be sought."

The book deals with how to use castings, explains simply how castings are made, including all the modern methods. The selection of the metal is adequately and very fairly dealt with. How to design castings and the dimensional tolerances to expect, is very well covered and ought to be read by all designers. The final chapter on buying castings and patterns is first class and if absorbed and implemented by buyers in this country, would probably do more to improve foundry efficiency than many of the specialized technical books which are published today.

H. G. HALL.

L'Industrie de la Fonderie compiled by the *Syndicat General des Fondeurs de France.* Published by the Société Nouvelle Mercure, 114 rue La Fayette, Paris 10.

This interesting publication opens with a general statement as to the position of the foundry industry in the French economy. It is stated that it absorbs 10 per cent. of the French coke output, 10 per cent. of the pig-iron production and 20 per cent. of aluminium made in France. There are 1,178 foundry concerns associated with the *Syndicat.* Under a sub-heading "History," the earliest bronze casting known is said to date from 3,000 B.C., but Simpson, the American authority has illustrated one—a frog carrying a lotus leaf—in his book and described it as coming from Mesopotamia a thousand years earlier.

One chapter of the book is devoted to the technique of castings production. It defines the various operations from patternmaking to heat-treatment, whilst another section tells of standardization and Quality Labels, the French equivalent of the British Standards Institution's "Kite" mark scheme. For castings, it is sought to accord a "Quality Label" when 80 (and later 90) per cent. of the production is satisfactory.

Information is given as to the French technician teams which visited the USA between 1949 and 1951 and the productivity drive in French foundries which followed. To-day the following figures are given as approximate to current production per man/month:—For iron castings (jobbing), one ton to 22 cwt.; steel castings, 7 to 30 cwt.; malleable, 6 cwt.; pressure-resisting iron castings, 30 to 32 tons; copper-base castings, 10 cwt. to 1 ton, and light-alloy castings, 2½ to 6 cwt.

On page 50, there is a very interesting table which gives the number of accidents in the foundry industry, listed under four headings—iron, steel and malleable, non-ferrous, die-castings and virtually light alloys—and giving for each the total number of accidents in 1958; the number causing absence from work; serious accidents; the number temporarily incapacitated, and the compensation paid for serious accidents. The latter figure was £200,000 for 4,689 accidents.

Of further interest to foundrymen is an account of the working of the French regional costs office, where any abnormality in an item of production in a foundry is confidentially brought to the attention of management for further study. Towards the end of the book (on page 73) there appears a graph showing the production of the unattached foundries from 1929 onwards, the 1938 output being taken as 100. It lends colour to the reviewer's opinion that some of the pre-1939 figures were equal to if not greater than to-day's figures.

Finally the book ends with a complete list of foundries attached to the *Syndicat.*

V. C. FAULKNER.

Publications Received

Founding/Welding/Production Journal, Vol. 1, No. 1. Published jointly by the Institute of British Foundrymen (South African branch), Institution of Production Engineers (South African Council) and the South African Institution of Welding, from 1st Floor, Pharmacy House, 80, Jorissen Street, Braamfontein, Johannesburg, South Africa.

The 12 by 10½-in. format of this magazine resembles that used in a phase in the history of *Modern Castings,* which was later discarded. It is the type which, in the reviewer's opinion, panders to advertisers by intermixing advertising and editorial matter. This can so detract from the worth of the technical papers as to relegate them to insignificance. The front cover of the issue illustrates not a foundry but an iron works. The only foundry article in this issue (which deals with casting defects and is by Mr. F. C. Goldsmith, a member of the technical staff of Foundry Services S.A. (Pty), Limited) is quite good, covering as it does many problems in both iron and non-ferrous foundry practice.

Talking about Wards. Issued by Thos. W. Ward, Limited, Albion Works, Sheffield.

The objective of this 32-page brochure is to tell, in abbreviated form, the activities of this very large group of companies. The list of services and products is indeed impressive and stresses to the reviewer's mind that even those who have been associated with the group for many years will find there are many aspects of the organization which were unknown to them.

News in Brief

Mr. JULIAN AMERY, Secretary of State for Air, visited the headquarters of Rolls-Royce, Limited, at Derby on July 14. During his tour he inspected the company's latest developments in jet engines for vertical take-off aircraft.

RUSTON & HORNSBY, LIMITED, Lincoln, have received an order from the British Transport Commission for 14 Diesel-electric locomotives. They are for service at Southampton docks and delivery is due for completion by midsummer next year.

FIELD-MARSHAL THE VISCOUNT SLIM, K.G., has chosen "Leadership" as his subject for the British Institute of Management's 7th Elbourne Memorial Lecture. It will be given at the Connaught Rooms, London, W.C.2, at 6.30 p.m. on Wednesday, November 8.

MORE THAN HALF of all the vehicles which left Leyland Motors Limited, during June, were shipped overseas. The biggest portion of these went to South Africa. Larger than usual shipments were made to Ceylon, Australia, Nigeria and Pakistan.

IT HAS BEEN REPORTED from Manila, the Philippines, that two diamond drilling units have arrived in Pagadian, Zamboanga del Sur, to start exploration for the Bataan Iron & Steel Corporation of the rich, high-grade magnetite iron deposits at Malatang, Liargao.

THE STANTON & STAVELEY SALES LIMITED, near Nottingham, supplied the spun-iron pressure pipes and fittings for the new water tower at Oaks Park, Norton, opened on July 12, by Sheffield Corporation to supply an area with levels of between 600 and 740 ft. above sea level.

THE WEST AUSTRALIAN GOVERNMENT has received seven tenders from companies seeking the mining and export rights to Tallering Peak iron ore. Although Mines Minister Griffith said that the number was pleasing, he did not reveal any information about tenderers.

THE INDONESIAN MINISTER of Basic Industries has stated in Lampung, South Sumatra, that iron ore deposits discovered in the area would be sufficient for 30 years of exploitation. The Government was planning to exploit and process these, as well as large deposits in South Kalimantan.

WEST AUSTRALIAN MINES MINISTER GRIFFITH and Japanese steel mission leader Yoshio Shimizu said in a joint statement that Western Australia had excellent prospects of a flourishing iron-ore trade with Japan. During their visit to the State, the Japanese mission's technical experts examined iron ore deposits and appraised existing and potential harbour facilities.

PADLEY AND VENABLES, LIMITED, pneumatic-tool manufacturers, Dronfield, near Sheffield, celebrate the Golden Jubilee of the foundation of the firm this year. It was founded 50 years ago by Richard Padley with a capital of £200. The firm now has assets of over £1 million, and the joint turnover of the works at Dronfield and Aldridge, near Walsall, is nearly £2 million.

Mr. W. S. SCOTT, managing director of the Darlington Forge, has been elected chairman of the Council of the British Steel Castings Research Association. He succeeds Dr. R. HUNTER, deputy managing director of the Clyde Alloy Steel Company, Limited. Dr. C. J. DADSWELL, managing director of the English Steel Castings Corporation, Limited, Sheffield, has succeeded Mr. W. S. SCOTT as vice-chairman of the Council.

A SUBSIDY of maximum $86¼ million will be provided for the Canadian National Railways by Government legislation authorizing the building of the Great Slave Lake Railway. Pine Point Mines, Limited, who require the rail line for the transportation of ore from Great Slave Lake to the Cominco smelter in Trail, B.C., would contribute up to $12½ million towards construction of the line, which will be 440 miles long.

AT THE RECENTLY-HELD annual general meeting of the British Welding Research Association, held concurrently with an exhibition, Sir Charles S. Lillicrap was re-elected as president of the Association, and Mr. D. J. W. Boag, Mr. C. H. Davy, Mr. T. McIver, Mr. R. B. Shepheard and Dr. T. W. F. Brown were re-elected to the Council. Viscount Ednam and Mr. W. Muirhead Watson were additionally elected to the Council.

DORMAN LONG (STEEL), LIMITED, Middlesbrough, announced on July 13 that two steel furnaces are to be temporarily closed at the Cleveland works because of slackness in demand for steel. A blast furnace at the Cleveland works is also to be closed temporarily for routine rebuilding work. The furnace has been operating for about five years. A week earlier the firm announced the closure of another steel furnace at their Redcar works.

AN ORDER worth more than £400,000 has been received from Russia by the Glacier Metal Company, Limited, Kilmarnock. Over the next two years they will supply machinery to make special crankshaft bearings for Russian motor-cars and trucks. Negotiations for the purchase of machinery began soon after the visit of a Russian trade delegation to the Kilmarnock Works in 1959. About three months ago, directors and technicians from Kilmarnock visited Russia.

MOWLEM (CIVIL ENGINEERS), LIMITED, who are preparing the 500-acre site at Tinsley Park for the new £26,000,000 steelworks of the English Steel Corporation, Limited, Sheffield, have accepted a challenge by Lord Knollys, chairman of English Steel Corporation, Limited, to beat the target date for the completion of the contract. They are seeking to reach a total of 1,000 workers on the job by the autumn, having already built up from scratch to 400. Over three-million tons of earth have already been moved.

THE ENGLISH ELECTRIC COMPANY, LIMITED, is to award a Fellowship worth £750 a year at the Royal College of Art next year. Its purpose is to enable a young designer to carry out research into the design and use of domestic appliances as a one-year post-graduate project. Up to £150 a year will also be awarded each year to those students who, in the opinion of a committee drawn from the college and the company, have produced the best designs. The £750 Fellowship will be awarded to the best student in this group.

Mr. W. BRINDLEY, managing director of Dartmouth Auto Castings, has been appointed to the board of the parent company, Birmid Industries, Limited. Mr. G. A. RIDER, deputy managing director of Birmid Industries, and Mr. W. BRINDLEY have joined the board of Sterling Metals, Limited, a subsidiary. Mr. F. S. TAYLOR has been appointed a director of Perry Bar Metal Company, Limited, another subsidiary. Following the acquisition of Sterling Foundry Specialities, Limited, by Birmid Industries, Mr. RIDER, Mr. W. C. JORDAN and Mr. E. PLAYER, junior, have joined the board of the former company. Mr. Rider will become chairman of the board.

Extensions at Enfield Rolling Mills

Major plant extensions for the continuous casting of rods, tubes and shapes have recently been completed at Enfield Rolling Mills, Limited, Enfield, Middlesex. The extensions had become necessary owing to the success of Encon continuous-cast alloys since their introduction less than five years' ago, and the new installation has doubled production. This increased production has also permitted a wider range of sizes and materials to be held in stock, and enables delivery to be made at short notice from over 1,500 stock items. In addition, speedier delivery of special orders for non-stock items will be possible. New storage and despatch facilities have been erected for delivery direct to customers at depots at Newcastle, Paisley, Cardiff, Belfast, Leicester and Manchester.

Production Range

By comparison with sand- and chill-cast metals, the properties of the firm's alloys are claimed as:—For BS 1400-PB1 alloy, the elongation is 10 per cent. minimum and the ultimate tensile strength 23 tons per sq. in. minimum. Continuous castings are made to any of the BS 1400 specifications for phosphor-bronzes, leaded phosphor-bronzes, gunmetals and leaded gunmetals. Castings are also made to other specifications as required. Stock sizes for rod are $\frac{1}{8}$ to $6\frac{1}{16}$-in. dia. and for tube $\frac{5}{8}$ to $6\frac{1}{16}$-in. o.d., with a minimum i.d. of $\frac{1}{32}$ in. Lengths greater than 12 ft. can be supplied if necessary, and all bars are mechanically straightened to give no more than $\frac{1}{4}$ in. arc depth in 5 ft. The dimensional tolerance on continuously-cast rod and tube is quoted as o.d. + 0.004 to − 0.006 in., and tubes are concentric to within 1½ per cent. of wall-thickness—a better value than is obtainable from drawn tube.

The continuous-casting plant installed at Enfield is similar to that developed by the American Smelting & Refining Company of New Jersey, and is operated under licence from that company.

International Research Corporation

A new corporation to provide research, technical information, investment advisory, and management services, in the United States and Europe has been organized by Dr. Clyde Williams, Columbus, Ohio, and his American and European business associates. Incorporated in Ohio, the Clyde Williams Corporation has its main offices at 50, West Gay Street, Columbus, and branch offices will be maintained in London (temporarily located at 17-19, John Adam Street, W.C.2), and in Paris. Dr. Clyde Williams, Dr. F. R. Hensel, Dr. L. Kermit Herndon, and Mr. H. H. Jackson, have been appointed to the board of directors.

In the technical information field, the Corporation is collecting engineering technological data for its clients and provides information relating to technical products, new production processes, equipment, company capabilities, patents, licence agreements and related matters. Its market studies includes analyses of the expected rôle of foreign companies in world markets, statistical investigations of existing and potential markets, sampling surveys of consumer purchasing habits and motivation, and studies of European Common Market problems. A major activity will be investment counselling and the collection of information needed for the management of investment portfolios.

Indian Foundry Techniques

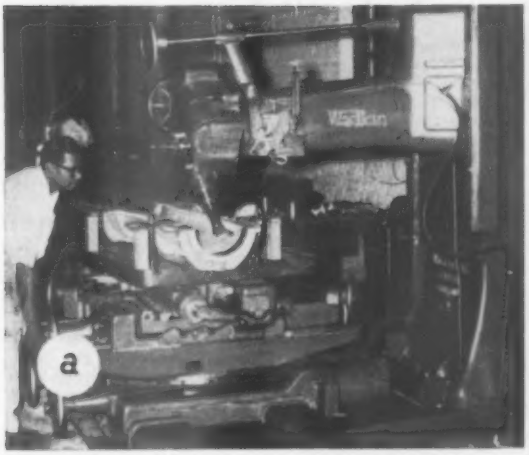
The very interesting pictures (on the facing page) of Indian foundry practice have been submitted by Mr. John Blakiston, M.I.MECH.E., foundry consultant, following a recent visit to that country:

Fig. (*a*)—Shows preparation of an aluminium core-box for a standard "special" pipe at the Kulti pattern-shops—of the Indian Iron & Steel Company—on one of the latest Wadkin pattern-milling machines. It has been found that with this modern equipment, aluminium patterns are becoming more economical than those of the traditional wood. *Fig.* (*b*)—In the standard pipe "specials" foundry at Kulti, a green-sand core is shown being lowered into a mould prepared on the firm's mechanized plant. *Fig.* (*c*)—A view of the new Kulti steel foundry, showing the manufacture of cast-steel charging-boxes for the Russian-sponsored steelworks at Bhilai; a high production rate is achieved, each team of operators making two boxes per day. *Fig.* (*d*)—Shows a number of cast-steel charging-boxes as referred to in *Fig.* (*c*) awaiting despatch. *Fig.* (*e*)—As a complete contrast with the previous illustrations this picture shows an old-established open-air iron foundry at Ramnagar for producing colliery-maintenance castings. It is the hundreds of small production units similar to this which create for the larger Indian foundries quite a problem in price-cutting. On account of the absence of overheads, they establish a price entirely uneconomic to modern foundries, but at the same time, cannot execute with continuity any order involving numerous components. While this type of production is supported for political reasons (classified as "cottage industry"), the very existence of such units tends to retard progress of industrialization accompanied by hygienic factory conditions and social services. *Fig.* (*f*)—In further contrast with *Fig.* (*e*), this illustration shows an experimental research low-shaft blast-furnace producing foundry iron at the National Metallurgical Laboratory, Jamshedpur. The idea is to investigate the possibility of building these small ironmaking units in the various states which are dissociated from the major iron-producing centres—again to follow the policy of building up local "cottage industries," irrespective of the economics involved.

AEI-Birlec Order from Czechoslovakia

AEI-Birlec, Limited, Erdington, Birmingham, 24, report the receipt of a large furnace order from Czechoslovakia. The value of the contract is £405,000 and includes the supply of continuous tray-pusher furnaces, gas-carburizing furnaces, sealed-quench furnaces, and nitrogen generators. The installations are all to be employed in the motor-vehicle and tractor industry.

Two continuous tray-pusher furnace installations will each comprise of two linked gas-fired furnaces—one high- and one low-temperature—which will be served by a flow of atmosphere from two nitrogen generators. When installed, this plant will be used in the production of annealed pearlitic-blackheart-malleable castings. A continuous tray-pusher gas-carburizing installation will comprise two gas-fired, single track, continuous furnaces one of which will incorporate a hot- and the other a cool-oil quench. This installation will also have atmosphere provided by Birlec generators. The unit is for the production of gears for the motor-vehicle industry. A further gas-carburizing furnace and two sealed-quench furnaces will be utilized in the production of small components.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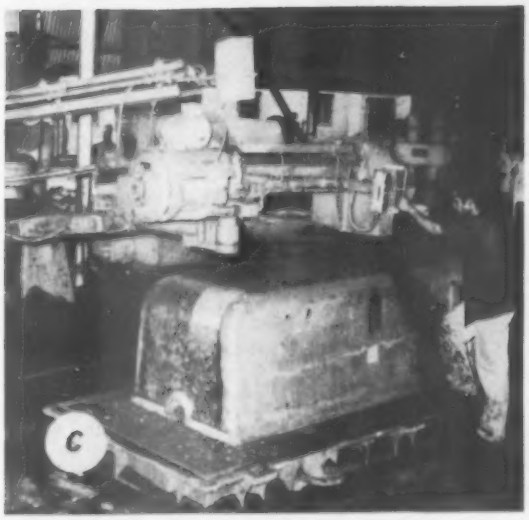
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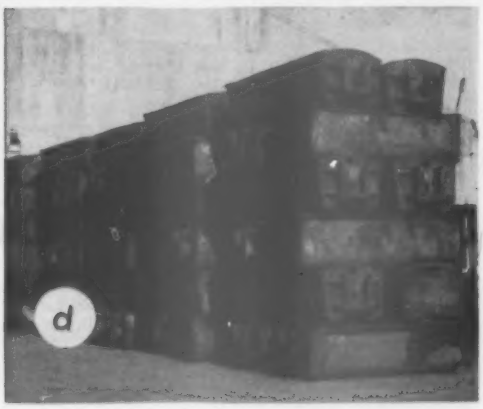
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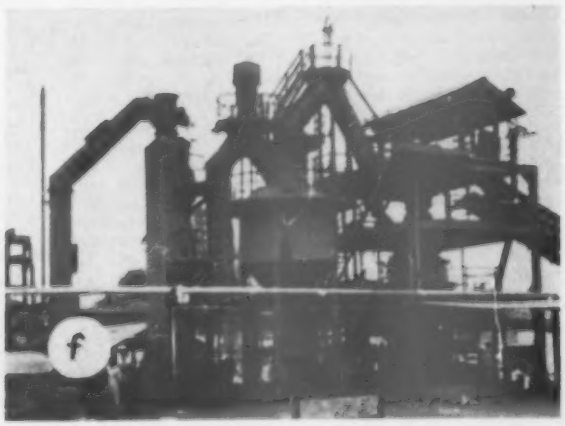
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Company News

RUSTON & HORNSBY, LIMITED, engineers, steel and ironfounders, of Lincoln—Net profit for the year to March 31, 1961, is £491,119 (£625,708). Despite the reduction, last year's dividend of 9 per cent. is being repeated.

HAMMOND LANE FOUNDRY COMPANY, LIMITED, Dublin—Net profit for the year to March 31, 1961, was £41,618 (£38,246) after tax of £23,072 (£18,937) and a final dividend of 12½ per cent. makes a total of 17½ per cent. on increased capital of £28,437 (same on smaller capital of £22,750).

CHARLES CHURCHILL & COMPANY, LIMITED, machinery and tool merchants, of Birmingham—The company has contracted to purchase the entire shareholding of Weatherley Oilgear, Limited, makers of machine tools and transmission equipment, of Biggleswade (Beds), which will continue with its present range of products.

SUTCLIFFE, SPEAKMAN & COMPANY, LIMITED, manufacturers of non-ferrous stampings and castings, brick and briquetting machinery, etc., of Leigh (Lancs)—With a final of 15 per cent., total dividend for the year to March 31, 1961, is being raised to 20 (17½) per cent. Group net profit increased to £92,273 (£79,742), after tax of £80,873 (£71,056).

HICK, HARGREAVES & COMPANY, LIMITED, engineers, ironfounders and millwrights, of Bolton (Lancs)—Following the 1 per cent. increase in the interim to 5 per cent., the final dividend at 15 per cent. is also raised by 1 per cent. making 20 (18) per cent. for the year ended March 31, 1961. Net profit is £397,503 (£397,903), after tax of £389,917 (£367,169).

JOHNSON, MATTHEY & COMPANY, LIMITED—Incoming orders for the first part of the current year to March 31, 1961, have, generally, been well maintained, reports the chairman, Mr. A. B. Coussmaker, and the outlook is "satisfactory." Expenditure of about £710,000 has been authorized for expansion of factory space and purchase of additional equipment at the Wembley and Harlow plants.

SHEFFIELD TWIST DRILL & STEEL COMPANY, LIMITED—Chairman and managing director, Mr. A. Dormer, reveals in his annual report for 1960 that the company's turnover was the highest ever, but the profit margins were not as good as in the past due to overall increase in costs. Net profit, before tax, was £698,139 (£517,078). The company has devoted much time to expanding its export trade, with the result that exports, which were a record, showed an increase of 47 per cent. over the previous year.

George Cohen Profits Down

Group profits of the George Cohen 600 Group, Limited, engineers, iron, metal and machinery merchants, of London, W.12, for the year ended March 31, 1961, fell by 12½ per cent., but the company is repeating the 13 per cent. total dividend as forecast when the two-for-five rights issue was made in November. The final dividend of 8½ per cent. is on £4,375,000 ordinary shares. Interim and last year's dividends were on £3,125,000.

Net profit is £644,808 (£785,071), after tax of £755,907 (£788,244). Although the machine tool interests of the group have probably had a satisfactory year, increased costs and competitive pressure, especially overseas, will have had the familiar effect on margins.

Coal Injection in Blast-furnaces

Speaking at the annual dinner of the Society of the Chemical Industry at Keble College, Oxford, last week, Lord Robens, chairman of the National Coal Board, said that the board was helping the steel industry in a plan to introduce a more economical method of using coal in blast-furnaces. The new process, never before tried in this country, could eventually replace at least 30 per cent. of the coke used in furnaces, and would have the advantages both of being cheaper and of making possible an increased output of steel.

Lord Robens said the new technique would be tried out at the Stanton Ironworks Company, Limited, near Nottingham, the injection equipment being specially designed by Petrocarb, the American firm which recently pioneered the full-scale application of the coal-injection technique in the US.

"This process," he said, "will mean the steel industry will use not more coal but less, but we regard it as our public duty to get the best we possibly can from the indigenous material beneath our feet. We in the coal industry must assist our customers to achieve the higher efficiencies that new techniques make possible."

The coal injected, he said, would fulfil the function of the coke it replaced by providing heat and gases for the reduction of iron ore. In the new process the coal was injected automatically into the furnace through lances placed, usually, in the blast-furnace tuyeres. The amount of coal injected was accurately controlled at a rate which could be adjusted to suit furnace conditions.

Referring to "dramatic changes" likely in the coal industry, he said that in a few years' time the industry would have reached the stage where coal could be mined without a single man being employed on the coal face. "It seems to me that this is a very sound development. There has never seemed to me to be any sense in condemning a human being to spend a third of his life 2,000 ft. or 3,000 ft. below the earth."

New Allen West Subsidiary

Specialists for more than 50 years in the manufacture of electric-motor-control gear and switchgear, Allen West & Company, Limited, of Brighton, are to branch out into new fields of control embracing digital techniques developed by the Digital Engineering Company, Limited, 136, Battersea Park Road, London, S.W.11. Dr. L. N. Bramley, who has been managing director of Digital Engineering since it started in 1956, takes up a full-time appointment in the same capacity on September 1, and Mr. W. N. Jenkins (the other original director of the company) is being retained as consultant. Mr. G. H. Cann becomes chairman of Digital Engineering, and also joining the board of the subsidiary company from Allen West & Company, Limited, are Mr. V. Laurence Breeze (deputy managing director), and Mr. J. Meares (secretary) and two senior engineers, Mr. J. R. Stacey and Mr. F. W. White.

The London firm's products include performance recorders, digital converters, rolling-mill programming equipment and complete on-line digital information handling schemes. In co-operation with their new subsidiary, Allen West & Company, Limited, will also be able to provide more complete schemes of programming and control for the most intricate industrial applications.

Equipment & Supplies

Magnetic Pulleys

Rapid Magnetic, Limited, Lombard Street, Birmingham, announce a new range of "Andox 5" permanent-magnet pulleys for extracting tramp iron from foundry sand, etc. The unit includes magnets made of anisotropic barium/ferrite/ceramic material, the exceptional coercivity of which permits a radial-pole construction as distinct from the axial disposition adopted with Alcomax magnets.

It is claimed that the superior field-intensities so produced are equivalent to those of electromagnetic designs, with flux distribution patterned to conform to the burden contour on the belt conveyor. Highest intensity thus occurs at the centre of the conveyor where burden depth is greatest. Permanence of magnetism is guaranteed for the life of an installation. With stainless-steel covers for long mechanical life, the pulleys are available in a range of sizes from 12- to 24-in. dia. for any normal belt width.

Spraying Machine

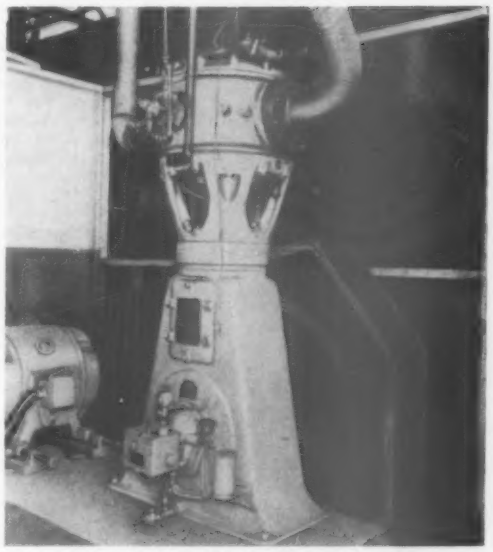
Alfred Bullows & Sons, Limited, Long Street, Walsall, Staffs, have recently developed a conveyorized automatic spraying machine, each basic unit of which consists of a conveyor track; a spraying station comprising one spray gun, a gun traverse motion and brackets and a down-draught exhaust system. Apart from the air required for spraying purposes, power is provided by two electric motors. One drives a gearbox *via* a five-speed step cone pulley, which in turn, through a series of shafts and cams drives the conveyor chain, operates the gun motions and also the automatic spray-gun operating valve. The extent of the gun motion is determined by the profile of the appropriate cam, of which a standard range is available. Compressed air at 60 lb. per sq. in. is required to operate spray guns and valves. Also available is a mechanical memory device which automatically signals the machine as to whether or not workholders are loaded.

Lubricant Injector for Die-casting

To deal with the problem of plunger lubrication in pressure-die-casting machines where the use of heavy lubes is generally considered essential, the Foundry & Metallurgical Equipment Company, Limited, Netherby, Queen's Road, Weybridge, Surrey, have introduced an automatic lubricant injector. It is a two-stage unit capable of dispensing heavy graphite-bearing compounds. The first stage draws the lubricant from a supply tank and pumps it to the second stage at a pressure of about 200 lb. per sq. in. From the second stage the lubricant is pumped at pressures up to 1,500 lb. per sq. in. and in quantities from 0.045 cu. in. to less than 0.0005 cu. in. The quantity is controlled with steel distance-pieces which limit the intake of lubricant. The unit, which can be fitted to existing machines, operates from a compressed-air supply of 60 to 150 lb. per sq. in. and can be controlled by an air pilot, a solenoid or a mechanical roller valve.

Air Compressor

A new range of air compressors featuring compact vertical design and rated for 24-hr. heavy-duty applications is announced by the air power division of Joy-Sullivan, Limited, Cappielow, Greenock. The WG-9 industrial air compressor is a single-cylinder, single-stage, water-cooled unit, designed for service as a main air supply for small factories and plants or as an auxiliary supply for larger plants. Available in six cylinder/stroke sizes giving free air delivered outputs of 75 to 334 cu. ft. per min. at working pressures of 15 to 150 per sq. in., the largest of these compressors requires a floor space of only 3 ft. by 3 ft. 5 in. Standard drive is by Poly Vee belt, though multiple vee-belt drive can be supplied to order. Direct couplings or gearboxes can be fitted for use with diesel engines. A complimentary range of compressors, designated WGO-9, has been designed to give completely oil-free air.



A Joy WG-9 industrial air compressor installed at the Hillington Works of Remington Rand, Limited.

Insulating Material

The Carborundum Company, Niagara Falls, New York, have introduced a new type of high-temperature insulating material, known as Fiberfrax. With its low thermal-conductivity, it is claimed that the material will withstand continuous use at temperatures up to 1,260 deg. C., and can be used at even higher temperatures for shorter periods of time. Applications developed for Fiberfrax include high-temperature furnace insulation and expansion-joint packing; insulation for furnace shafts and refractory rollers; liners for combustion chambers in domestic heating units; gasket material in vacuum casting of alloy-steel ingots; hot tops for metal ingot moulds; heat-resistant clothing and flame curtains, to mention but a few. The Carborundum Company, Limited, Trafford Park, Manchester, 17, are the sole selling agents for this material in the United Kingdom.

Gaseous Fuel

The Calor Gas (Distributing) Company, Limited, 178-202 Great Portland Street, London, W.1, recently organized a Press visit to their subsidiary manufacturing company, Waller Engineering, Limited, which

Equipment and Supplies

has recently opened new works at Millbrook in the Southampton area. This works makes appliances for the combustion and distribution of butane and propane gases. The objective of the conference was to demonstrate the versatility of these fuels, the former being used mainly for domestic and the latter for industrial purposes. The central theme is that industry is being encouraged to take delivery of the fuel by road in 7-ton tanks to be housed in prepared silos outside the works.

The liquid fuel which gasifies at normal temperature has a calorific value claimed to be about six times greater than town's gas and can be used for lighting and heating. Thus in a foundry it may be suitable for ladle drying, shell-mould curing, melting for die-casting or sand casting of non-ferrous metals, the heating of core-stoves and mould-drying units. The company also operate a research and development department to advise potential users.

Photo-electric Equipment

The use of photo-electric switching units using infra-red light beams for the protection of property against intrusion is now well known and accepted as normal. Large areas, however, are difficult to protect, particularly out-of-doors. A long range photo-electric equipment (Series MPU.2) has been designed by Lancashire Dynamo Electronic Products, Limited, Rugeley, Staffs, to be used in applications where the direct line of sight distance between the light project and receiver units may be as great as 1,500 yards (1,370 metres). The problem of spurious operation due to extraneous light is overcome by the use of a "modulated" light beam so that the photo-electric receiver is sensitive only to this "modulation." Semi-conductor techniques are used exclusively in the receiver unit and the system is arranged to "fail to safety" if tampered with. Suitable optical and mechanical arrangements are fitted on the standard equipment to enable initial alignment of the two units to be carried out readily. Such equipment can be used, for example, to operate on/off signalling where the expense of laying cables would be prohibitive and in industry where normal photo-electric units are inoperable due to brilliant ambient lighting, *e.g.* near furnaces.

Instrumentation Alarm Unit

When applying extensive instrumentation on industrial plant, where some form of alarm signal is required on a central control panel, Thomas Industrial Automation, Limited, Altrincham, Cheshire, have produced suitable units. These can be supplied for either one-, two- or multi-point alarm systems and any number of these units can be added together to form a complete indicating system. The units are designed for flange mounting on to existing or new panels. They are 3-in. wide by 6½-in. high and the front panel is made of cadmium-plated mild steel. Multi-point units can be supplied in wall-mounting cases. A feature of this unit is that no matter how many units are added together, only one audible alarm and one cancellation button are required. The rear of each unit is fitted with a connecting plug for interconnection to adjacent units and to mains and external control circuits. It is complete with its own interlocking relays, utilizes low-voltage signal lamps, and is fitted with a dust-proof cover.

Elapsed-time Clock. Elgin National Watch Company, Elgin, Illinois, USA, have placed on the market what they claim to be the smallest available elapsed-time indicators in the western world, weighing about 1½ oz. each. The indicators have either a dial or digital read-out and will record up to 1,000 hr., though units for other time-ranges are available. They are cylindrical in shape, 0.68 in. dia. and 1.42 in. long (dial type), of 1.76 in. (digital type). Operation is by a synchronous electric motor and gear train available for single-phase, 400 cycles, 115 v. or 26 v. and there is also a 28-v. d.c. model; power consumption is one watt. The dial-type indicator is fitted with white hands and a black dial-face and is readable to within 0.1 per cent. UK representatives for the time clocks are Aeromaritime, Limited, 45, Ladbroke Square, London, W.11.

IBF National Works Visits Day

For the twelfth year in succession, the Institute of British Foundrymen is to hold a National Works Visits Day and this year, the Lancashire branch has undertaken the necessary organization. The objective of the function is to give members unable to attend the IBF annual conference, an opportunity of participating in an annual national gathering of foundrymen and have available a wide selection of works visits from which to choose a pair of major personnel interest.

Programme

The visits—to a number of firms in the Manchester area—will take place on Friday, October 27, and the Institute is indebted to the firms who have offered facilities and hospitality. The scheduled arrangements are shown in Table 1.

TABLE 1.—*Works to be visited in the Manchester Area.*

Visit A ...	Leyland Motors, Limited, and British Northrop, Limited.
Visit B ...	Thomas Robinson & Sons, Limited, and Walmsley (Bury) Group, Limited.
Visit C ...	Associated Electrical Industries, Limited, and Linotype & Machinery, Limited.
Visit D ...	British Railways Foundry and Gresham & Craven, Limited.
Visit E ...	Dobson & Barlow, Limited, and Henry Wallwork & Son, Limited.
Visit F ...	Mather & Platt, Limited, and George Richards & Company, Limited.

Members are requested to indicate on a reply form which of the visits they prefer to attend and—as the number permitted in each party is strictly limited—their second and third choices. Each pair of visits will consist of a morning and an afternoon visit, with luncheon in between. In each case, luncheon will be provided by the first-named firm at the conclusion of the morning visit. Coaches taking parties of members on the various trips will leave from Whitworth Street West (between Gloucester Street and Albion Street), Manchester, at 9.0 a.m.

Dinner

In the evening, there will be a dinner and entertainment at the Grand Hotel, Aytoun Street, Manchester. The charge for each pair of works visits, including transport by coach, luncheon, gratuities and administration expenses, is 22s. 6d. and the additional charge for dinner is 25s. 6d. per person.

Members who wish to participate in this function are asked to return the application form to the Institute of British Foundrymen, 14, Pall Mall, London, S.W.1, not later than September 30 and earlier, if possible. Those who are unable to return home on the same day should make their own arrangements for hotel accommodation and are advised to book as early as possible. A list of hotels is available from the Institute.

Translation Services

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 1997 FURTHER DEVELOPMENT OF MECHANICAL-WEIGHING EQUIPMENT FOR STEELWORKS. (From German.) Fricke, H. *Stahl Eisen*, 1960, *80*, Oct. 13, 1398-1403. (£5.) A number of examples of modern weighing machines, mainly for internal use in iron and steelworks, are described and future trends are indicated. (*JISI* abstract, 1961, Mar., 263b.)

BISI 2137 STUDIES ON MILD-STEEL ENAMELLING. I—ON THE PRE-TREATMENT OF MILD-STEEL PLATE FOR ONE-COAT ENAMELLING. (From Japanese.) Yamada, T. *J. Metal Finishing Society of Japan*, 1960, *11*, Feb., 10-14. (£6 15s.)

BISI 2162 NEW APPARATUS FOR THE IMMEDIATE MEASUREMENT OF THE CARBON POTENTIAL OF FURNACE ATMOSPHERES. (From German.) Schmidt, T., and Wunning, J. *Stahl Eisen*, 1960, *80*, Dec. 22, 1952-54. (£2 5s.)

BISI 2191 RECENT RESEARCH WORK ON THE BORON/CARBON SYSTEM. (From Russian.) Samsonov, G. V. *Zhur. Fiz. Khim.* (Moscow), 1958, *32*, Oct., 2424-9. (£3.) Based on a comparison of the data on the properties of alloys of the system boron/carbon a tentative diagram has been plotted for the system within the concentration limits 0-80 per cent. carbon.

BISI 2214 INCREASING THE SENSITIVITY OF THE INDUSTRIAL DILATOMETER WITH MECHANICAL RECORDING DEVICE. (From Russian.) Kislyakova, E. N. *Zavods. Lab.*, 1956, *21* (2), 240-241. (£1 10s.)

BISI 2150 S.-G. IRON FOR MINING-MACHINERY COMPONENTS. (From Russian.) Gorushkina, L. P., *et. al. Lit. Proizv.*, 1960 (5), 42-43. (£1.) Instead of structural carbon and low-alloy steels, spheroidal-graphite iron is used for mining machinery components. Its properties are similar to those of the above-mentioned steels as regards service life, and some examples are given of components cast in this material which have given relatively long periods of service. (*JISI* abstract.)

BISI 2217 WALL BLOCKS OF ELECTRIC-ARC FURNACES FROM MAGNESITE-CHROME BRICK WASTE. (From Russian.) Kaibicheva, M. N., *et al. Ogneupory* (Moscow), 1960, *25*, (4), 186-188. (£1.)

BISI 2218 SULPHUR METHOD OF DETERMINING OXYGEN (OXIDES) IN METALS. (From Russian.) Babko, A. K., *et al. Zavods. Lab.*, 1956, *22* (6), 640-645. (£4.) Application of the sulphur method to the determination of oxygen in a series of metal oxides, including those of iron and manganese, is described. The method is based on the combination of the oxide oxygen with sulphur to form sulphur dioxide which is determined iodimetrically. The metal is converted to the sulphide. Reaction of sulphur with Fe_2O was found to be almost complete at 700 deg. C., the rate at 1,000 deg. C. being appreciably faster; for Mn_2O_3 the corresponding temperatures are 500 and 900 deg. C. The experimental blank determines the minimal quantity of oxygen which can be dealt with. (*JISI* abstract, 1957, Sept., 78.)

BISI 2219 DETERMINATION OF THE RATE OF HYDROGEN DIFFUSION IN METALS. (From Russian.) R. A. Ryabov and P. V. Geld. *Zavods. Lab.*, 1958 (3), 306-308. (£3.) By means of special apparatus, the relation between temperature and the rate of diffusion of hydrogen in various iron alloys with C, Cr, Si and other alloy elements was investigated, as it was also for a number of structural steels. This rate is based on the law of the square root of the hydrogen pressure at low temperature (ferrite/carbide structure), and at high temperature (austenite structure). (*JISI* abstract, 1958, Dec., 450b.)

BISI 1968 NEW POSSIBILITIES IN METALLURGY, THANKS TO THE REACTIONS OBTAINED BY THE INJECTION OF PULVERULENT MATERIALS INTO LIQUID METALS. (From French.) Allard, M. *Rev. Mét.*, 1960, *57*, Nov., 985-9. (£2 15s.)

BISI 2041 SOME PROBLEMS ON TESTING SCALE FORMED IN DIFFERENTLY-FIRED FURNACES. (From Hungarian.) Reinhold, M. *Koh. Lapok* (Budapest), 1959, *11*, Aug., 381-3. (£3 5s.) The adhesion of scale affects significantly the quality of the surface of the rolled-steel products. This property depends on the chemical composition and physical structure of scale. These are, on the other hand, results of the combustion process in the heating furnace and can be controlled accordingly. (*JISI* abstract.)

BISI 2062 INFLUENCE OF SPECTROSCOPIC CARBON ON PROBLEMS OF SPECTROSCOPIC ANALYSIS. (From Italian.) Rüssmann, H. *Met. Ital.*, 1960, *52*, June, 280-288. (£5.) The influence of graphite and carbon on the problems of spectroscopic analysis is examined. The graphite group has a resistivity of 1,750 microhms/cm while the carbon group has a resistivity of 4,500 microhms/cm—for the same excitation energy a difference of 700 deg. C. exists between the plasma temperature of the d.c. arc for the two groups. The regularity of the d.c. arc flame during the excitation of elements of low ionizing potential (e.g. alkalis) is discussed as well as the thermal conductivity of the electrodes and the effect of the carbon on the analysis of solutions. (*JISI* abstract.)

BISI 2118 PURIFICATION OF STEELWORKS FUMES: BASIC BESSEMER PLANT AND PROCEDURES FOR THE REFINING OR PRE-REFINING OF PIG-IRON BY MEANS OF PURE OXYGEN. (From French.) Septier, L., and P. Leroy. *Centre Doc. Sidér* (Paris), 1959, *16* (3), 651-678. (£6.) This article is a summary of one part of IRSID publication, A.194 (BISI 1647). The characteristics of the brown fumes evolved, in particular with the use of pure O_2, are described, and a critical review is given of cleaning methods: cyclones, single and multi-stage and electrostatic filters, and bag filters. (22 refs.) (*JISI* abstract.)

BISI 2134 INVESTIGATION OF ANTIQUE IRON COMPONENTS FROM COLOGNE CATHEDRAL. (From German.) Daeves, K. *Stahl Eisen*, 1940, *60*, Mar. 21, 245-252. (£4 5s.) The author describes an investigation of some pieces of iron taken from Cologne Cathedral. These had been exposed to weathering for about 500 years. Full particulars of the analysis are given and tables are presented of the analyses of many museum specimens, and the probable processes of manufacture are discussed. (*JISI* abstract, 1940, *142*, 39A.)

BISI 2157 THE NEW STEELWORKS AT OUGREE OF THE SOCIETE COCKERILL-OUGREE. (From French.) Flament, P. *Rev. Univ. Mines*, 1960 (11), 11-28. (£3 5s.)

BISI 2186 HYDROGEN IN STEEL AND ITS EFFECTS. (From French.) Bastien, P. *ATB Metallurgie*, 1958, *1* (5), 127-138. (£6 10s.) A review of the processes by which H, is introduced into and removed from steel and one of the effects produced by its presence; blowhole formation, hot-cracking and embrittlement, with notes on pipe failures in the Lacq natural gas lines. (Abstract preprinted from *JISI*.)

BISI 2203 RECENT DEVELOPMENTS IN THE FIELD OF BLAST CLEANING. (From Dutch.) Zaat, J. H. *Metalen* (The Hague), 1960, *15*, Aug. 31, 277-279. (£2.) Since a Dutch decree in 1957 prohibited the use of sand as a blasting agent, research on the whole process of blasting, as well as on substitutes for sand, has been necessary. Earlier work (abstracted in *JISI*, 1958, Sept., 90b) is summarized, and new developments reported.

BISI 2262 CAST IRON CONTAINING NODULAR GRAPHITE. PRESENT POSITION OF RESEARCH AND DEVELOPMENTS. Grossmann, H. *Giessereitechnik* (Berlin), 1960, *6*, Oct., 314. (15s.)

BISI 2263 CASTING HALF-INGOT MOULDS, HEAVY SECTION PLATES, FLANGES, ETC., IN GREY CAST IRON WITH AN UNGATED RISER. (From German.) Scholz, J. *Giessereitechnik* (Berlin), 1960, *6*, Oct., 3-11. (15s.)

BISI 2279 SERVICE LIFE OF GRAPHITE-FIRECLAY BRICK IN STEEL CASTING LADLES AND STEEL FURNACE LAUNDERS. (From Russian.) Zegzhda, V. P., *et al. Ogneupory* (Moscow), 1959 (9), 419-423. (£3.) With steels containing over 0.5 per cent. C, the graphite-fireclay ladle does not affect the carbon content of the metal, but the use of such linings for low carbon or rimming steels has still to be investigated. Optimum proportions and methods of manufacture are given for these linings. (*JISI* abstract.)

The following translation is among those recently made by Mr. H. Brutcher, Technical Translations, P.O. Box 157, Altadena, Calif., USA.

HB 5136 ULTRASONIC INSPECTION OF WELDS IN CASTINGS. Ermolov, I. N. *Svarochnoe Proizv.*, 1958 (11), 29-32.

New translations in course of preparation include:—

BISI 2260 PROBLEM OF AIR POLLUTION WITH SPECIAL REFERENCE TO FERROUS METALLURGY PLANTS, PARTICULARLY STEELWORKS. (From German.) Guthmann, K. *Radex Rund*, 1961, Feb., 449-484.

BISI 2292 METALLURGY OF THE BASIC-BESSEMER PROCESS. (From German.) Oelsen, W., and H. Maetz. *Arch. Eisenhut.*, 1948, *19*, 111-117.

BISI 2282 INVESTIGATIONS OF THE TEMPERATURE AND RATE OF WORKING AS FACTORS IN THE PLASTIC DEFORMATION OF METALS. (From Russian.) Ageev, N. P. *Ibid.*, 17-21. (Included in response to requests—List B 57.)

BISI 2293 EFFECT OF THE VELOCITY OF THE MEDIUM ON THE CORROSION OF STEEL 1KH18N9T. (From Russian.) Shvarts, G. L., and I. G. Volikova. Sbornik Statei Vsesoyuz. Nauch.-Issled. i Konstr. Inst. Khim. Machinostr., 1958, *25*, 75-86.

BISI 2304 EFFECT OF MANGANESE CONTENT ON INGOT MOULD LIFE. (From German.) Kiesel, K-L. *Neue Hütte*, 1961, *6*, May, 284-291.

Translation Service

Withdrawals:—

BISI 944 ELECTRICAL AND THERMAL CONDUCTIVITY OF THE ARC FURNACE. (From French.) Hugot, R. *L'Aciérie Electrique*, 1957 (Cahiers du Cessid) (1), Pt. 4, 1-23.

BISI 1349 INVESTIGATION BY STATISTICAL METHODS ON THE RELATIONS BETWEEN THE MAGNETIC INDUCTION OF PLAIN-CARBON STEEL CASTINGS AND THE CHEMICAL ANALYSIS AND BRINELL HARDNESS. (From German.) Kolorz, A., and K. Löhberg. *Giesserei*, 1959, *46* (8), 187-190.

BISI 2268 RAPID DETERMINATION OF ALUMINIUM IN STEEL WITHOUT SEPARATION OF THE IRON. Doleschel, H.-H. *Stahl Eisen*, 1961, *81*, Mar. 30, 448-449. This translation has been withdrawn, because it has been translated by Mr. H. Brutcher, Technical Translations, P.O. Box 157, Altadena, Calif., USA, ref. HB 5189.

Other people's translations:—

The initials BCIRA, etc., stand for the organization to which enquiries for the following translations should be made, quoting the reference numbers. Addresses are given at the end of the list.

BCIRA 993 MOULDING SANDS WITH ADDITIONS OF GLYCOL ESPECIALLY FOR CASTING HEAVY METALS. Brunhuber, E., and W. Büchen. *Giesserei*, 1960, *47*, June 30, 358-361.

BCIRA 994 NEW CORE- AND MOULD-PRODUCTION PROCESSES WITH "DIDILEIM KP." Chroszcz, L., and W. Konig. *Giessereitechnik*, 1960, *6*, July, 204-207.

LC SLA 61-13919 PRODUCTION OF ULTRA-LIGHT-WEIGHT REFRACTORIES. Kamenichnyi, M. S. *Ogneupory* (USSR), 1958, *23* (6), 284-285. (mi. $1.80, ph. $1.80.)

BCIRA 992 BEHAVIOUR OF MALLEABLE CAST IRON UNDER IMPACT STRESS. Löhberg, K., and H. G. Trapp. *Giesserei*, 1960, *47*, June, 283-287.

BCIRA 1000 INFLUENCE OF RESIDUAL ELEMENTS ON THE SOLUBILITY AND ACTIVITY OF CARBON AND THE DEGREE OF SATURATION IN CAST IRON. Neumann, F., H. Schenck, and W. Patterson. *Giesserei*, 1960, *47*, Jan. 28, 25-32.

BCIRA 991 EFFECT OF LADLE ADDITION ON CAST IRON. DEGREE OF NORMALITY AND RELATIVE HARDNESS AS QUALITY CRITERION. Patterson, W. 25th *International Foundry Congress*, Liège, 1958, Paper No. 5, 83-105.

OTS 61-11148 LIMITS OF ALLOWABLE CONCENTRATIONS OF ATMOSPHERIC POLLUTANTS, Book 4. Ryazanov, V.A. ed. Trans. of mono. Predel'no Dopustimyye Konsentratsiy Atmosfernykh Zagrayazneniy, Moscow, 1960, bk. 4. ($2.75.)

SLA 60-18349 COKE-GAS CUPOLA FURNACE. Noskov, B. A., Yu. G. Rozenberg, *et al. Lit. Proiz.*, 1958 (11), 14-15. (mi. $2.40, ph. $3.30.)

DSIR: M 2947 THE STRUCTURE OF THE GRAIN BOUNDARIES AND THE HEAT RESISTANCE OF AUSTENITIC STEEL. Sokolkov, E. N., *et al. Metallov i obra Met.*, 1958 (11), 19-25.

Symbols for sources of translations:—

BCIRA: British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham. LC: Photoduplication Service, Library of Congress, Washington, 25, D.C., USA. OTS: Office of Technical Services, Department of Commerce, Washington, 25, D.C., USA. SLA: SLA Translation Centre, The John Crerar Library, 86, East Randolph Street, Chicago 1, Illinois, USA, and DSIR: Department of Scientific and Industrial Research, 20, Chester Terrace, London, N.W.1.

New translations, now in preparation, which will be included in the BISI Translation Service if more requests are received:—

E 2282 INVESTIGATIONS OF THE TEMPERATURE AND RATE OF WORKING AS FACTORS IN THE PLASTIC DEFORMATION OF METALS. (From Russian.) Ageev, N. P. *Kuznechno-Shtampovochnoe Proizvodstvo*, 1960, *2*, July, 17-21.

E 2301 EFFECT OF As AND P IN HIGH-ALLOY Cr AND Cr-Ni STEELS. (From Czech.) Benes, F. and D Tlusta. *Hutnické Listy* (Prague), 1960, *15*, Dec., 929-936.

Technical Translation Bulletin

The March, 1961 issue of the *Technical Translation Bulletin* contains, among other things: List of recent publications (especially dictionaries); Commonwealth Index to Unpublished Translations (by the Information Officer of Aslib); translation of technical books; Chinese literature at DSIR, LLU; mechanical translation from Russian to English and review of two linguistic periodicals (Lebende Sprachen and Babel). The *Bulletin* is sent *gratis* to all members of the Aslib Technical Translation Group. Enquiries to 3 Belgrave Square, London, S.W.1.

Stal' in English

A comparison of the economics and other aspects of the open-hearth furnace and oxygen-blown converter processes, and recommendations for future installations, are made in *Stal' in English*, 1961, January 16-19. *Stal' in English*, the translation of the Russian journal *Stal'*, is published by the Iron and Steel Institute.

Personal

Mr. P. J. J. ROBERTS has been elected a director of Berry's Electric, Limited.

Mr. W. A. KING has been appointed a director of Wm. Cory & Son, Limited.

Mr. C. J. BAKER has been appointed an additional director of Ductile Steels, Limited.

Mr. ROY E. LELONG has rejoined Armstrong Whitworth Aircraft, Limited, as general sales manager.

Mr. Justin H. SCOTT has been appointed to the board of Laurence Scott & Electromotors, Limited.

Mr. A. V. BILLINGHAME and Mr. P. J. MARCH have been appointed directors of Shell Chemical Company, Limited.

Mr. W. F. ANDREWS, head of the science department of Doncaster technical college for 25 years, is retiring.

Mr. JOHN FRANCIS CRITTALL has been appointed a director of the Darlington & Simpson Rolling Mills Limited.

Mr. J. HILL has been appointed works manager of the Derby plant of Ley's Malleable Castings Company, Limited.

Mr. A. K. SIMCOX, Mr. J. S. HUGHES and Mr. H. N. FENN have been appointed to the board of Midland Silicones, Limited.

Mr. A. B. ROOD, B.A., sales manager, has been appointed a director of refractory specialists, Chambers Bros. Limited, Effingham Mills, Sheffield.

The appointments of Mr. H. ANDREWS as secretary and of Mr. H. L. HUDSON as chief accountant, are announced by Wickman, Limited, Coventry.

Mr. J. C. HALL and Mr. E. P. GALLAGHER have been appointed to the board of directors of the Tees Side Bridge & Engineering Works, Limited.

Mr. E. BEALING, formerly managing director, has been appointed chairman of Sandvik Steel Band Conveyors in succession to the late Mr. J. F. SJOGREN.

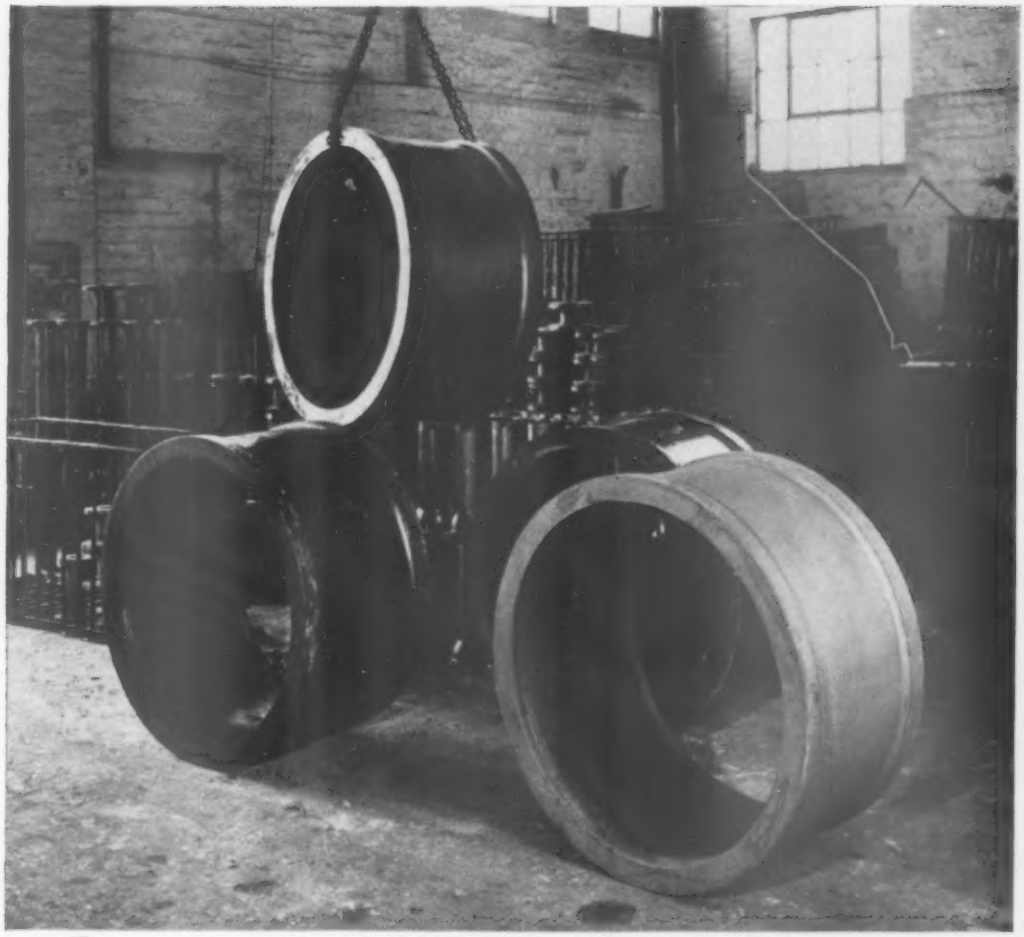
Mr. T. L. BIRRELL has joined the board of Yarsley Research Laboratories, Chessington. Mr. Birrell was, until recently, managing director of Halex, Limited.

Mr. NEVILLE ROBINSON has been appointed to the new post of assistant director of the Electrical Development Association. He will take up his duties in September.

Mr. HAROLD WHITELEY, a director of W. C. Holmes & Company, Limited, engineers, Turnbridge, Huddersfield, has been installed as president of Huddersfield Rotary Club.

Sir BEN LOCKSPEISER, Mr. C. F. HODSON and Mr.

(Continued on p. 90)



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SAMPLES AND FULL PARTICULARS GLADLY SENT ON REQUEST

Personal

W. H. WEST have been appointed to the board of J. H. Shand, Limited, a member of the Staveley group of companies.

Mr. D. G. LAMONT, production manager for Watson, Laidlaw & Company, Limited, manufacturers of centrifugal machines, Glasgow, has been appointed an additional director.

Mr. C. J. LUBY has resigned as joint managing director of Dowty Rotal, Limited, and has accepted an invitation to join the board of the Bristol Aeroplane Company, Limited.

Mr. B. FLOWERS has been appointed director of sales for the superdraught under-floor-draught fire division of the Ouzledale Foundry Company, Limited, Long-Ing Foundry, Barnoldswick, Lancashire.

Mr. HERBERT W. BENNETT has retired as sales director of the Birmingham Battery & Metal Company, Limited, after 51 years' service. Mr. ANTHONY W. GIBBINS, deputy managing director, will be responsible for sales.

Mr. MICHAEL LEWIS, chairman of De Vere Holdings, Limited, has been elected chairman of Oxley Engineering Company, Limited, Mr. S. STANSFIELD has been appointed deputy chairman and managing director of Oxley Engineering.

Mr. G. FOSTER and Mr. E. N. HIGHTON have been appointed directors of Dorman Long & Company, Limited. Mr. J. D. BOLCKON has been appointed a special director. Mr. C. HIPWELL has retired from the board of the company.

Mr. E. A. PARSONS, director and general manager of Roberts & Company, Limited, manufacturers of beater and refiner bars, is retiring at the end of the month after 51 years' service. He will be succeeded by Mr. MICHAEL CROMEY-HAWKE.

Mr. M. J. NOONE and Mr. S. R. CHETWYND ARCHER have been appointed joint general managers of Whessoe, Limited. Mr. A. G. GRANT, managing director, who is in indifferent health, will be on sick leave during the next three months.

Mr. J. BURRELL has been appointed general manager of R. J. Hunt & Son, Limited, Lifford Foundry, Kings Norton, Birmingham, 30, one of the Brockhouse group of companies. Mr. Burrell was formerly on the executive staff of the Duport group.

Mr. J. A. V. WATSON, O.B.E., will be appointed assistant managing director of Castrol Industrial, Limited, upon the retirement of W. F. LIST on January 1, 1962. On the same date Mr. Watson also becomes an assistant managing director of the parent company, Castrol Limited.

After 51 years' service with W. T. Glover & Company, Limited, a subsidiary of British Insulated Callender's Cables, Limited, Mr. J. H. MAXWELL, a director and general manager, has retired from his executive duties. He remains a director of the company.

Amongst the recipients of Insignia Awards announced by the City and Guilds of London Institute are Mr. W. G. MURRAY, F.I.M., under the heading of foundry practice, and Mr. A. GOODALL (iron and steel). The former is on the staff of the United Steel Companies, Limited.

Mr. G. SHAW-SCOTT, the founder, and for many years the secretary, of the Institute of Metals has been appointed a vice-president of the Automobile Association in recognition of his 20 years' service on the executive committee. Mr. Shaw-Scott who is 77 joined the AA in 1909.

Mr. DAVID SWERDHOW, managing director of Modern Kitchen Equipment Company, Liverpool, Limited, has been elected a Fellow of the Hotel and Catering Institute in recognition of his services in organizing weekend student courses and a careers convention and exhibition.

Mr. C. M. VIGNOLES who retired on June 30 from the post of managing director of Shell-Mex and B.P., Limited, has been appointed as chairman of Evershed & Vignoles, Limited, electrical engineers, of London, in succession to Mr. J. C. NEEDHAM who recently retired from the board of the company.

Mr. A. KENDAL, apprentice metallurgist at William Beardmore & Company, Limited, Glasgow, has been awarded the Colvilles Gold Medal in Metallurgy, May, 1961, and another of the firm's apprentice metallurgists, Mr. I. M. KILPATRICK, has been awarded the Clyde Alloy Gold Medal in Metallurgy, May, 1961.

Mr. W. A. FRATER, chairman and managing director of Otis Elevator Company, Limited, has relinquished the position of managing director and becomes chairman and chief executive officer. Mr. CHARLES F. DAY, who has been associated with the company for over 30 years and a director since 1955, has been appointed managing director.

Mr. ARTHUR BRIDGE, ironworks engineer; Mr. PERCY DIXON, steelworks engineer; Mr. E. S. GREENHILL, Frodingham steelworks engineer; and Mr. G. E. MART, plant engineer, of the ore-preparation department, recently retired from the engineering staff of the Appleby-Frodingham Steel Company, after many years' service with the firm.

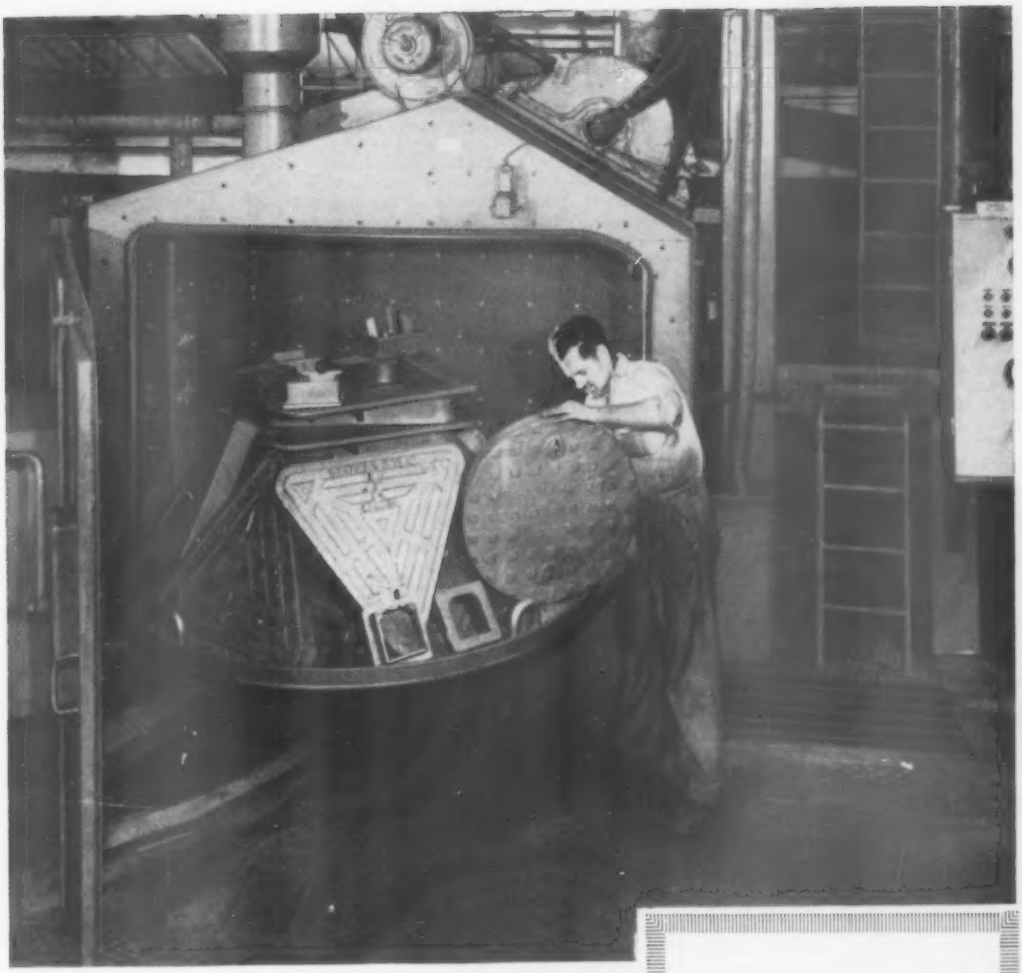
Among honorary degrees conferred at a graduation ceremony in Sheffield City Hall on July 1, were Doctor of Science, Sir ALEXANDER TODD and Professor N. F. MOTT. Doctor of Metallurgy, Dr. ULICK R. EVANS. Doctor of Letters in Economic Studies, Sir DENNIS HOLME ROBERTSON, and Doctor of Technical Science, Dr. D. T. A. TOWNEND.

Mr. JOHN P. BOLTON has been appointed managing director of George Cohen Sons & Company (Australia) Pty. Limited, Sydney, a subsidiary of the George Cohen 600 Group. He succeeds the late Mr. C. A. Bell. Immediately prior to his new appointment, Mr. Bolton was the Colchester Machinery Corporation, Limited's eastern regional manager in Montreal.

An Australian S.G. Iron Producers Association has been formed following a meeting held in Sydney. It will also embrace New Zealand. The chairman is Mr. GORDON KEECH, Keech Castings Pty., Limited, the vice-chairman, Mr. WILLIAM MAIN, T. Main & Sons Pty., Limited, Victoria, and the honorary secretary, Mr. JOHN DICKSON, Hadfields Steel Works, Limited.

Mr. JAMES M. HARRISON, formerly vice-chairman, has been appointed chairman of Peglers, Limited, in succession to Mr. A. E. EMBERTON who resigned at the annual meeting on July 4. Mr. W. WICKS also resigned with effect from the same date. Mr. ERNEST WEBSTER and Mr. JOHN W. EMBERTON have been appointed directors to fill the vacancies on the board.

MASSEY-FERGUSON (U.K.), LIMITED, announce the appointment of two new regional managers in the United Kingdom sales organization. Mr. R. V. MUSPRATT, at present used-equipment merchandising manager, becomes northern regional manager, while Mr. I. D. BIRDSEYE, who has been until now an area manager, is appointed east central regional manager.



Baker Perkins Foundry Machinery at work... *at Garton & King Ltd.*

In Exeter, Garton & King Ltd. use this Baker Perkins Swing Table Shot Blast Machine to treat a very wide range of pieces. This machine saves space—it occupies less room than free tunnel type units. It saves power—you don't need compressed air plant. And although it is based on the rotary table principle, it can handle larger and heavier pieces than conventional machines.

Baker Perkins Ltd.

Engineers

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PHONE: JARROW 897124

BP.F8

HISTORICAL NOTE

"At the sign of the Golden Hammer".

The predecessors of Garton & King Ltd., were known in 1662, and they have had a foundry since about 1800. They now produce a wide range of municipal castings and gear wheels, besides general engineering castings in iron, gunmetal and aluminium for use at home and overseas. They still preserve their trade sign of "The Golden Hammer" which has been in use for over 200 years.

Raw Material Markets

Iron and Steel

Overall requirements of iron castings continue steady, but there is no undue pressure for supplies from any of the foundries, and signs of some falling off in demand will be accentuated by holiday influences. Meanwhile the engineering and speciality foundries continue to obtain fairly substantial outputs of high duty castings and demands keep most of these establishments engaged on a normal working week. Their consumption of pig-iron is at a high level and consists mainly of the low phosphorus irons, together with good quantities of hematite and some refined iron.

Many of the light foundries would welcome an increase in business which continues moderate for castings for domestic appliances. Those catering for the building trades are fairly well occupied and there is also a good demand for cast iron pipes. The jobbing and textile foundries would also appreciate more work.

All grades of pig-iron are in adequate supply and most producers have tonnages to spare after current demands have been met. Basic steel-making pig-iron comprises the major portion of production which, although not at maximum output levels, is more than adequate to cover consumption and stock needs, and exports. The several makers of the low phosphorus irons are able to satisfy the needs of engineering and speciality foundries without difficulty, and suppliers of hematite are able to cope with current demands, as also are the makers of refined irons. Production of the high phosphorus irons is not fully absorbed although the number of furnaces now making this grade has been reduced. Consignments continue to be shipped to overseas buyers, and makers welcome this additional business which enables them to reduce their stocks.

The foundries are able to cover for most of their scrap requirements, although there are persistent demands for special qualities. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks are available to requirements.

The re-rollers could undertake much more business than that at present arising for most of their products. Re-rollers of small bars and light sections are finding it extremely difficult to obtain sufficient business to make up full rollings, and in many instances the work on hand will only maintain production for a short time ahead. Additional business is also required for strip and bright drawn bars. Good quantities of reinforcing bars and rods continue to be produced.

The re-rollers are well provided with mild steel semis and home steelworks could increase on present deliveries appreciably. Fresh business for steel semis is only being placed as stocks on hand at the mills are used up. The supply of alloy and carbon steel semis continues to show improvement. Arisings at the steel works of suitable re-rolling defectives and crops continue to be in demand.

Non-ferrous Metals

Non-ferrous metal markets, including tin, are dull on both sides of the Atlantic. In tin, markets have suffered from a general abatement of demand from all sources. In London the market is unreceptive and with outside consumer interest at a low ebb there is little activity and prices are prone to give way on any reasonable pretext. Singapore tends to be erratic but, on the whole, easier. New York is indifferent, reflecting the approach of the holiday season and the tailing off of demand from the tinplate industry. The US price has fallen to around $1.16 cents a pound.

The one item of interest in this market remains the question of whether the US Government will release 4,000 tons of tin from one of its stockpiles. There have been so many rumours about its imminent release that dealers are not prepared to believe anything.

Copper is a weak market and the prevailing price trend is downwards. The sustaining factors concern possible interruptions to supplies in the autumn because of the possibility of a strike at the big Canadian Noranda Mine, the breakdown of wage negotiations at Potrerillos and at El Salvador in Chile, and the still disturbed political situation in the Rhodesias. The US market is quiet and the price structure unchanged, with both producers and custom smelters quoting 31 cents a pound—equivalent to £248 a ton. This compares with the LME price which is fluctuating between £227 and £230 a ton.

Lead is quiet in London and the price is moving narrowly around £64 a ton. In the US the market is experiencing idle trading conditions and the price is unchanged at 11 cents a pound.

Zinc in London is quiet and reasonably steady with ample metal about to meet demand. The price is fairly stable around £77 a ton. In the US the market is quiet and the price is unaltered at 11½ cents a pound.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

843,098. British Iron and Steel Research Association, 11 Park Lane, London, W.1.

An annular heat-insulating assembly for a feeder head for an ingot mould. It includes uncompacted heat-insulating material surrounding a thin-metal wall, the face of the wall away from the heat-insulating material being covered by a thin lining made of refractory material and of small heat capacity.

843,289. British Oxygen Research and Development, Limited, Bridgewater House, Cleveland Row, St. James's, London, S.W.1.

The manufacture of steel in an electric-arc furnace.

843,412. Eiichiro, A B E, 290 Ikushi Ooaza Ooita, Ooita-prefecture, Japan.

A method of making an inlay mould or precision-casting mould from a wax pattern. A sprue tube made of steel, preferably stainless, is heated and inserted into the wax pattern so as to be secured thereto. The wax pattern secured firmly to the sprue tube is invested with an investment compound in a casting ring so that the end of the tube projects somewhat from the investment compound. The pattern is heated externally to a temperature of from 580 to 720 deg. C., preferably 600 to 799 deg. C., to eliminate the wax. The principal objectives of this invention are to prevent deformation of the wax pattern and to eliminate the danger of foreign matter entering the casting mould.

843,582. Société Industrielle de Brevets et D'Etudes 190 Avenue de Neuilly, Neuilly-sur-Seine, France. (Inventor: Andre Louis Mennesson.)

Improvements in casting techniques in the manufacture of carburetters for internal-combustion engines.

843,640. Diamond Alkali Company, 300 Union Commerce Building, Cleveland, 14, Ohio, USA.

Treatment of molten metal for the removal of impurities such as sulphur, phosphorus, and silicon.

Precision casting

FROM STABLE RAW MATERIALS

UNDER CONTROLLED CONDITIONS

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated. In accordance with Iron and Steel Board Price Determination, 1961, No. 2, the prices of products listed below coming under the board's control are increased by 1 per cent.)

July 19, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over, Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham; £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 10s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 13s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C; £40 11s. 0d.; silico-manganese, £43 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £227 10s. 0d. to £227 15s. 0d.; three months, £230 10s. 0d. to £230 15s. 0d.; settlement, £227 15s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 2⅝d. per lb., rods, 245s. 6d. per cwt. basis; 20 s.w.g., 280s. 6d. per cwt.

Tin.—Cash, £908 0s. 0d. to £909 0s. 0d.; three months' £918 0s. 0d. to £919 0s. 0d.; settlement, £909 0s. 0d.

Lead (Refined Pig).—Second half July, £64 10s. 0d. to £64 15s. 0d.; second half October, £65 15s. 0d. to £65 17s. 6d. settlement, £64 15s. 0d.

Zinc.—Second half July, £77 12s. 6d. to £77 15s. 0d.; second half October, £78 17s. 6d. to £79 0s. 0d.; settlement, £77 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £116 0s. 0d.; rolled zinc (boiler plates), all English destinations, £113 15s. 0d.; zinc oxide (Red Seal); d/d buyers' premises, £92 1s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 9½d. per lb.; sheets to 10 w.g., 198s. 9d. per cwt.; wire, 2s. 8½d.; rolled metal, 198s. 9d. per cwt.

Brass (Brazing).—BS1400, B3, £176; B6, £220.

Brass (High Tensile).—BS1400, HTB1, £193; HTB2, £215; HTB3, £230.

Gunmetal.—BS1400, LG2, £217; LG3, £227; G1, 1%, £297; G1, 1%, £287.

Phosphor Bronze.—BS1400, PB1 (AID released), £314; BS1400, 90/10/1, £303.

Leaded Phosphor Bronze.—BS1400, LPB1, £240.

Phosphor Bronze Strip, etc.—Strip, 296s. 3d. per cwt.; wire, 4s. 2d. per lb.; rods, 3s. 4¾d.; tubes, 3s. 4¾d.; chill cast bars, solids 3s. 4¾d.; cored, 3s. 5¾d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £65 0s. 0d. Nickel, £660 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £244; AB2, £252.

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A small percentage of ALMARINE core oil yields an even sand mix which reproduces well, this results in accurate cores, capable of standing up to considerable handling and produced with short ovening times.

ALMARINE brings true economy to core-making.

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Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY MANAGER desires change. Practical experience plus 18 years supervising capacity. High duty and grey irons, floor, bench, mechanised. All-round foundryman. Resident Midlands. Box FM850, FOUNDRY TRADE JOURNAL.

EXPERIENCED REPRESENTATIVE, expert Foundryman and Engineer (55), A.M.I.B.F., now relinquishing important post general manager (foundry), wishes contact responsible firm requiring substantial business in ferrous and non-ferrous castings. Every support given from present directors, car, phone, etc. Midlands only. Full time engagements only entertained. Box ER853, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN (33), technically trained, fully experienced mechanised and jobbing in all types of cast iron, desires change where effort will be appreciated. Box FF852, FOUNDRY TRADE JOURNAL.

WORKS MANAGER/ENGINEER (41) requires new appointment. Successful record includes experience Modern Mechanised Foundries, Repetition Machine Shops, Malleable and Grey Iron, Automatic Moulding, Planning, Installation, Maintenance and Development. Implementation capital works schemes. Good qualifications. Salary required £2,000-£2,500. Box WM847, FOUNDRY TRADE JOURNAL.

FOUNDRY WORKS MANAGER, 48, desires change preferably with non-ferrous foundry in the South or South Midlands. Wide technical, practical and sales experience in all aspects of ferrous and non-ferrous founding including CO, and Shell processes. Box FW837, FOUNDRY TRADE JOURNAL.

FOUNDRY DIRECTOR (37), A.I.M., M.I.B.F., with present company 12 years, desires change. Experience covers all aspects grey iron and non-ferrous castings production. Salary required £2,000. Box FD846, FOUNDRY TRADE JOURNAL.

EXPERIENCED FOUNDRY MANAGER wants situation South of England, or abroad, 48 years of age, complete control foundries home and abroad last 20 years, ferrous and non-ferrous, hand or mechanised, sound practical and technical knowledge, good organiser and cost conscious. Box EF838, FOUNDRY TRADE JOURNAL.

SITUATIONS WANTED—*contd.*

FOREMAN MOULDER, 37, requires position in a jobbing foundry, the north of England or Ireland preferred. Fully experienced. Box FM850, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

A.P.V.-PARAMOUNT LTD.

One of the principal stainless, heat resisting and alloy steel foundries in the United Kingdom invites applications for the position of

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Applicants, preferably with knowledge of Castings Inspection, should have experience of Metrology and Non-destructive Testing.

The appointment offers an attractive salary, with appropriate recognition given to technical qualifications, and is superannuated.

Applications giving full personal details should be addressed for the attention of the Personnel Manager,

A.P.V.-PARAMOUNT LTD., MANOR ROYAL, CRAWLEY, SUSSEX, quoting reference No. 695.

POSITION vacant for experienced PATTERN MAKER for tied Foundry, North Kent. Apply to Box PV836, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FOUNDRY PRODUCTION MANAGER. Age group 40/50, for quantity production of Grey Iron Castings. Successful applicant must possess technical ability and have had practical production experience. Box FP865, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, with engineering background, to be responsible for planning, supervision and progressing non-ferrous rod production, large and small runs. Details of experience with salary required to Box FM866, FOUNDRY TRADE JOURNAL.

EXCEPTIONAL opportunity offered to young man as REPRESENTATIVE London and Home Counties. Some connection and knowledge of Foundry work an advantage. Please state age, present salary and fullest details of career to date to: Box EO810, FOUNDRY TRADE JOURNAL.

TECHNICAL SALES REPRESENTATIVE for High Duty Grey Iron Shell Mould and Sand Castings, for West Midland Foundry. Must have had previous experience in this field, and also have some engineering knowledge. Only men with initiative and ability to get results need apply. Staff Pension Scheme in operation. Full details in confidence, stating experience, age and salary required, also date when available, to Box TS844, FOUNDRY TRADE JOURNAL.

DRAUGHTSMAN

required for design of layout, plant and equipment for expansion of Precision Casting facilities involving a wide range of interesting engineering work in ceramic, chemical metallurgical and plastics plant.

Design or detailing experience in one of these fields or in connection with investment casting would be advantageous.

Good salary with half yearly bonus. Non-contributory Pension and Life Assurance Scheme.

Apply to the Personnel Manager,

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Hayes Middlesex.

(A Division of Westland Aircraft Limited).

SITUATIONS VACANT—contd.

ASSISTANT RESEARCH DIRECTOR required by the Roll Makers' Association of Great Britain for the preparation of technical reports, reviews, bulletins, etc. Metallurgical and/or mechanical engineering qualifications and an ability to evaluate experimental and other technical data are essential. Some administrative experience in the iron, steel or foundry industries an advantage. Applicants with particularly appropriate experience might be considered up to 55 years of age. Birmingham City Centre. State age, experience, qualifications, salary to PEAT, MARWICK, MITCHELL & Co., Beaufort House, Newhall Street, Birmingham 3.

FOREMEN required by large iron foundry in West Midlands area, producing highly cored, short series castings up to 1 ton. Experienced in Greensand Cores and Slinger CO_2 production. Previous training in supervision essential. High salaries include scrap and activity bonus. Reply, in writing, stating age and experience, to Box FS854, FOUNDRY TRADE JOURNAL.

AGENCIES

ESTABLISHED MANUFACTURERS' AGENT, based Manchester covering Lancashire, Cheshire and Yorkshire, desires to represent reputable Iron Foundry. Box EM843, FOUNDRY TRADE JOURNAL.

PROGRESSIVE Company having recently doubled floor space is interested in agency or distributorship for Midlands area. Modern storage accommodation, lorries and forklift capacity available. Anything considered. Particulars to MESSRS. PETER BILLSON & Co. LIMITED, Triplet Works, Pikehelve Street, West Bromwich. Telephone Tipton 2453/4.

HAMPSHIRE Ferrous and Non-ferrous Foundry requires AGENT on commission basis. Representative of non-competitive goods with good connections in Southern half of England requiring additional outlet would suit. Box HF851, FOUNDRY TRADE JOURNAL.

ALUMINIUM Foundry in North Midlands making sand castings in all grades of aluminium desires AGENTS in the following areas: East Midlands, West Midlands, North West England. Appointment by interview. Apply Box AF861, FOUNDRY TRADE JOURNAL.

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Cleveland Plant and Machinery Co., Ltd.,

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Best prices given

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MACHINERY WANTED—contd.

MACHINERY WANTED

WANTED, SAND MILL, 5 ft. or 6 ft. dia. pan, preferably with bucket loader and aerator. Box WS857, FOUNDRY TRADE JOURNAL.

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MODERN "LUKE & SPENCER" 24 in. Duplex High Speed Fettling Grinder with extraction unit. 400/3/50. £255.
"Broomwade" 150 C.F.M. Industrial Twin Compressor Plant. 400/3/50 motor, receiver, etc.
2,000 deg. Electric Furnace. Capacity: 36 in. × 14 in. × 16½ in. Almost new. £145.
"Morris" Electric Ton. Fully Slewing Crane. S.R. Motor & Controller. All steel jib. 18 ft. £135.
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Box ML841, FOUNDRY TRADE JOURNAL.

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B.M.M. Airdraulic Stripping t/over by hand, Type CM46.
Osborn 704L. Jolt Sq. Strippers. Also other types of m/cs.
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"Titan" 75-lb. cap. Coreblowers.

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Morgan Type C.A. Oil-fired 15-cwt. cap. with preheater, Blower, Pump, and Oil Storage Tank.
300-lb. cap. Oil-fired Bale-out with Burner and motorised Blower.
Monometer Rotary TType: 1-ton and 2-ton cap.
Gas-fired, various makes, 100, 150, 300, and 400-lb. cap.

CUPOLETTES:

Davies 2 ft. 6 in. dia. shell, 10/12 cwt. cap.
"Titan" 3 ft. 6 in. dia. shell with Skip Hoist, Fan, etc.

Fettling Grinders:

Hilltop D.E. Ped. type 30 in. × 4 in. wheels.
Rowlands D.E. Ped. type 30 in. × 4 in. wheels.

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MACHINERY FOR SALE—contd.

REQUIRED to purchase. Small-med. Non-ferrous Foundry in or around London area. Box RT849, FOUNDRY TRADE JOURNAL.

LUKE & SPENCER Swing Frame Grinder. Bigwood 30 in. D.E. Fettling Grinder. Noble & Lund 30 in. Horizontal Band Saw. Jackman 4 ft. Shot Blast Cabinet with built-in Dust Arrestor and Compressor. Three only 500 lb. Al. oil fired Tilting Furnaces by Morgan. Box LS854, FOUNDRY TRADE JOURNAL.

ELECTRIC HOIST BLOCKS from ½ ton to 5 ton capacity in stock at attractive prices. Box EH855, FOUNDRY TRADE JOURNAL.

THREE COLEMAN-WALLWORK type CN moulding machines for sale. Reconditioned and guaranteed as new. Box TC856, FOUNDRY TRADE JOURNAL.

MONOMETER 1,800/2,000 lb. aluminium capacity fully mechanised oil fired rotary Melting Furnace. Cylindrical body rotating on two machined tyres arranged with one open end for charging and exhaust. Suitable cowling and stack. Firing by K.B. 24 in. motor driven fan and swinging pillar type No. 2. Wallsend Burner for 200 sec. oil. All electrics for 440 volt 3 phase 50 cycles supply. Price £1,350. For further information and appointment to inspect contact MR. A. J. BALDWIN, LIGHT PRODUCTION LTD., Liverpool Road, Slough (Bucks). Phone Slough 24147-8-9.

PAN MILLS. 4 ft. and 5 ft. dia. underdriven, stationary pans, self-discharging, new, for delivery from stock. W. & A. E. BREALEY (MACHINERY), LTD., Misterton, nr. Doncaster. Tel. Misterton 202.

TWW

COLEMAN WALLWORK WT563 Jolt Squeeze Straight Draw Moulding Machine, 22½ in. × 19 in. table.
Type HPL3 Jolt Squeeze Pattern Draw Moulding Machine by B.M.M., table 36 in × 25 in.
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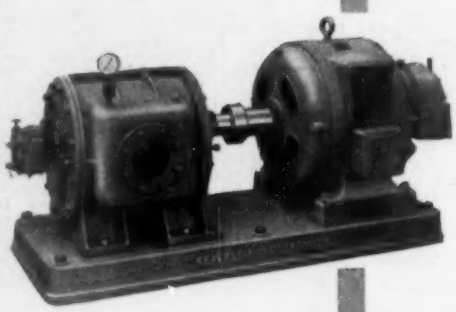

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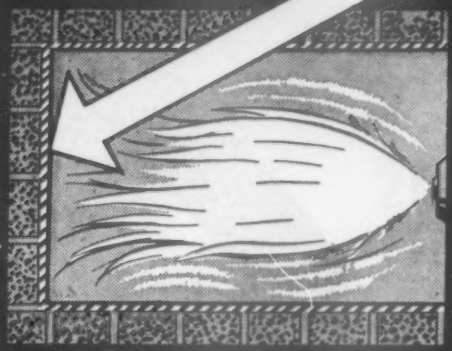

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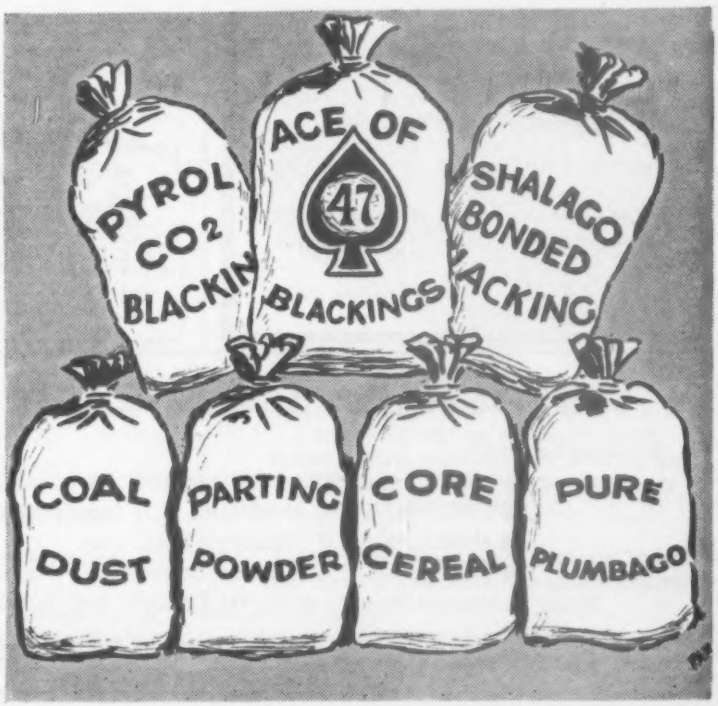

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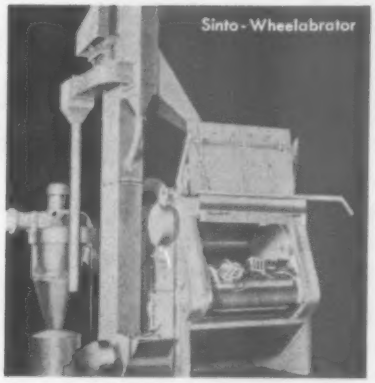

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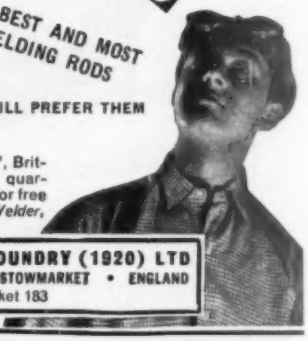

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